THE GARMENT OF GOD

"Thus working at the roaring loom of time,
I weave God's living garment."

GOETHE

The Garment of God

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INFLUENCE OF NATURE IN HUMAN EXPERIENCE

BY

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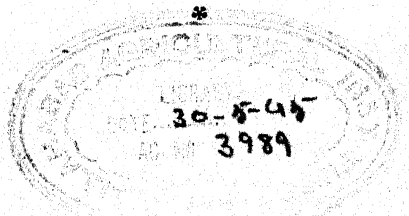

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In affectionate remembrance
this volume is dedicated to the memory of
ADA GERTRUDE MERRIAM
who more than any other person
contributed suggestions and aid in the study
of this theme.

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INTRODUCTION

WE MAY ASSUME that no individual is competent to present full discussion of the many problems concerning influence of nature upon human life and thought, and yet it is important to consider formulation of ideas in this field of continuing study. The interest of the writer in examining this subject has arisen in large part from intensive work in the natural sciences, in which it was realized that through this approach there develops a certain responsibility for considering the relation of nature to man.

Mention may also be made of the fact that over a considerable part of a lifetime the educational activities of the author have been devoted to examination of means by which human appreciation of values in the world about us may be developed. It is not material for the moment whether the approach to nature be for the purpose of making technical acquaintance with science, or whether the ultimate objective is philosophic or perhaps looks toward some other major field of thought. In all cases we discover that an effective study or a comprehensive understanding of nature requires recognition of the human values to be found in the world around us.

In connection with research on natural phenomena, it has also been clear to the writer that consideration of nature in the scientific sense relates itself intimately to other types of acquaintance, which, as in art, have seemed to be based mainly upon emotional experience. It is noted also that one may not approach this subject without ultimately examining its broader philosophical and even its religious implications.

In another phase of personal experience the author has been concerned with examination of nature as a subject for research in the field of conservation—or looking upon nature as a great asset, the full understanding of which requires a forward look with the hope of obtaining some understanding of values in this resource for the future. One must not only know what the materials are from which the contribution of nature comes, but it is necessary at the same time to have understanding of the extent to which these values may be expected to maintain themselves.

Correlated with constructive conservation there must be ability to recognize features of nature having human significance, and we must learn how to use them effectively. And not only must we increase the effectiveness of use, it is essential that we safeguard the materials against destructive agencies. This means intensive study of a conservation or planning program for the nation and the world. It means a

better understanding of the basic elements upon which our interpretation of nature rests, and clearer evaluation of qualities inherent in human nature as well as of the world around us. It means that we should know the way in which these points of view have been developed through the vast eons in which mind and soul have been taking form. This seems to have been due partly to the continuous contact with nature, and partly to impact of nature upon the soul. If there are natural elements that interfere with the highest development of man, they should be eliminated, but those things that have human significance should be cultivated and utilized in furthering advance of evolution.

Companionship with nature results in a better acquaintance with our own personalities—As we see our personal qualities reflected in nature we come to know better what we ourselves are. The result of this acquaintance with ourselves should be enhancement of joy in life, and consequent increase in effectiveness of living. The broader, deeper, and clearer view of the world in which we live, that comes from the suggested acquaintance with nature, means improved understanding of the forces and laws expressed in activities of the world about us, and of the comprehensive movement of history including evolution or advance of mankind. A relation such as has been sug-

gested is unquestionably of the first order of importance to all who wish to have part in an understanding, constructive world movement, such as commends itself to the intelligence of a progressive mankind.

The title of this book has been suggested by a quotation from Carlyle's translation of Goethe's *Faust* in which the spirit conversing with Faust says "'Tis thus at the roaring loom of time I ply and weave for God the garment thou see'st Him by." One of the basic elements considered in this work concerns the significance of time to which the spirit makes reference as "the roaring loom of time." Also an important phase of discussion in these chapters relates to development of the world about us as expressing the being or creative activity of whatever intelligence or power exists behind nature. This activity in the history of the earth, considered in the light of interpretation of nature as we know it, corresponds in a measure to the suggestion in *Faust* of weaving "for God the garment thou see'st Him by."

Chapter I

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WHAT IS APPRECIATION OF NATURE?

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WHAT THE WORLD about us means to human beings is reflected in the various aspects of what is often called appreciation of nature. There is then reason for examining the many elements in this appreciation, and making inquiry as to how they are related to one another.

Appreciation or love of nature must be looked upon as involving approach in every conceivable direction from which human interest may view its surroundings. The æsthetic, as commonly interpreted, comprises much of what is concerned. But there are other attitudes of mind or points of view at least equal in importance or perhaps more significant.

Commonly what we call love of nature or appreciation of nature is made up of many factors which may be of different types. It may express itself through the gamut of human interests and reactions, ranging from what seem purely physical activities on through the æsthetic, intellectual, scientific, philo-

sophic, and religious. It may be based upon purely personal experience, or on something arising from the cultural history of our ancestors.

The aspects of our reaction to nature comprised in physical activities are not unimportant. Life under natural conditions suggesting absence of purely social restraints with the right to grow in our own way, is commonly a stimulus to untrammelled bodily freedom and action. It may have large therapeutic or curative value for both physical and mental states. The wish to run and leap, or to climb the hill for a wider view, is a desirable tonic. When it ceases to be such, one may know that the tide of our strength is running low.

The infinite combination of pleasing sense impressions derived from nature through color, form, pattern, sound, and the symmetries or harmonies which they produce, has led us into the path of emotional development represented by the æsthetic in many combinations. In appreciation of the beautiful one thinks immediately of pictorial art as representing nature. So also we recognize that harmony of form upon which architecture is based. But we must consider not merely how we see nature in terms of light, shape, and pattern. It must be examined in terms of how we feel about it personally in the intellectual and emotional sense. And it must be remembered

that emotion may rest on intellectual experience as well as upon other materials.

The impact or stimulus given through the endless series of mysteries presented by action of the forces in nature has advanced intellectual inquiry through development of science and philosophy. With the growth of science, understanding of nature extends to deeper reaches and over a widening field. In corresponding measure we see the emotional reaction to the intellectual stimulus from nature building itself to higher levels.

Unanswered questions concerning our personal relation to the world of power about us in nature have contributed toward development of certain aspects of religion.

Appreciation of nature lies then in this wide group of interests, with their combined physical, intellectual, and emotional appeal. It may be limited to one thing; or it may be many combined.

The mission of those who have sought the sources of human value in contemplation of nature represents one of the great quests of all time. Success in defining or in directing attention to these springs of interest, stimulus, and comfort would mean making more fully available to the world some of the ways in which to enjoy life and to "glorify God" while life is lived. Search for means of expression touching

elements of value in nature has interested nearly every group of workers concerned with formulation of great human problems. Painter, poet, philosopher, scientist, theologian, have all busied themselves with these questions.

To the study of nature appreciation the artists whom we classify as painter and landscape architect have made great contributions, but the poet has perhaps reached farthest in expressing the features present.

As study of this particular problem advances it seems clear that to limit art merely to the pictorial, to color, form, and similar aspects of representation does not express its mission adequately. Rather may one say that the art of those who study nature should not be set off in closed fields separate from science and other subjects. It is a mode of expression which may be utilized to present, perhaps in the most realistic and most highly imaginative and most humanly appealing form, the results derived from all kinds of approach to nature.

Applied in this connection art may be a method of statement of what is found in the field of the pictorial or in science or in any field. It does not relate merely to superficial aspects of form or perspective or color. It is not merely a harmony, although it must always be harmonious. It must always be realistic

and must show harmonious relations with a maximum of human appeal. By artistic expression a thing is so identified or isolated as to make its nature clear, and it is presented by the method which will best develop human appeal. Such is the illustration found in a sudden beam of light showing a mote in a dingy room where previously space, perspective, and reality had not been evident. Similar is the illustration of a bird floating in the deep air of Grand Canyon, giving depth to the landscape.

Art, even as seen from the point of view of the scientist, gives the truest reality because it represents things by that means which is humanly most effective, namely, by the imagination. This is the way by which the mind itself most easily grasps a subject. Stated in another form, art gives the largest opportunity for imagination and is yet of necessity fully realistic.

Standing on the fringe of what may be called the field of art experience, the writer has assumed that above and beyond the area of his vision through science, the æsthetic or the beautiful may represent the largest part of what is comprised in true appreciation of nature. Considered from one point of view, beauty as representing harmonious relations with large human appeal might be looked upon as including all the concepts of time, space, power, movement, and

progress as visualized by the scientist. These elements are in fact often described by the scientist as beautiful. To him they are familiar things seen in relations expressing a condition of harmony which may be at least as striking as are such relations commonly presented by the artist. These concepts of the scientist are based upon extension of knowledge representing other conditions as definite or real as are the elements of an artistic composition. Perhaps artists will some day come for whom these elements will have appeal, and will present them upon canvas or in literature.

Coming out of the atmosphere of research at the University of California, the following poem by Miss E. Brazier suggests relation of scientific truth to beauty so often stated in various ways through the ages.

Beauty and Truth share one abode, I know;
It is a fallacy that Truth is plain;
As beautiful as mountains tipped with snow,
So loveliness adorns the Truth's domain.
To worship Beauty is not heresy;
As light comes with the Dawn, so does Truth shine
Through moments of exalted ecstasy,

It is not theirs the heart of Truth to see,
Who with fine scorn have Beauty's spirit flayed.
Beauty and Truth are one in Light and Power
As is the rose, the seed, and blossomed flower.

In the statement of realities touching nature one should perhaps have a graded series in which science represents facts, philosophy presents logic, art illustrates harmonious presentation, and religion gives us reverence. We know of course that not all things in rhythm are poetry, nor all paint on canvas pictures, nor all congeries of facts science, nor all statistics economics, nor all decisions business or government, nor are all beliefs religion.

Returning to concrete applications of nature appreciation, it is important to note that the great value of outstanding phenomena in nature does not lie merely in their influence for the moment. It concerns things of a given day, but it relates also to the effect that produces permanent reorganization of the mind in such manner as to give new views of the universe and of our place in it. In nature as under other conditions we appreciate the meaning of Keats' lines in "Endymion" that:

> A thing of beauty is a joy for ever:
> Its loveliness increases; it will never
> Pass into nothingness; but still will keep
> A bower quiet for us, and a sleep. . . .
>
> Nor do we merely feel these essences
> For one short hour; no, even as the trees
> That whisper round a temple become soon
> Dear as the temple's self, so does the moon,

The passion poesy, glories infinite,
Haunt us till they become a cheering light
Unto our souls,

While it is not possible to develop a classification of elements viewed in appreciation of nature which will cover all cases or all people, there may be value in attempting an outline of certain groups. It is not feasible to place these items in order of importance, as that sequence will differ according to the individual or the situation, but one arrangement may be set down as follows:

1. Physical and recreational.
2. Values that relate to purely personal incidents.
3. Companionship with nature.
4. Æsthetic.
5. Magnitude, power, law, as representing sublimity.
6. Time and change with their consequences.
7. Nature as representing something intangible behind what we see.

(1) There should be no doubt that opportunity for purely physical expression of the individual in relation to the freedom of nature is a feature of much importance for the present and future of mankind. It involves that natural untrammelled life which represents our past and helps to build health of body and mind for the future. It may lead to other interests of intellectual and spiritual type.

(2) Human interest reflects itself in nature through appreciation of elements which have special relation to personal or family or national experience. Things touching joys or sorrows of earlier life, along with experiences which have had favorable influence in stimulating us to activity, or in offering relief or rest may be attractive. Personal association with nature lacks generally those elements of antagonism so frequently involved in human affairs. The soothing and quieting influence of nature taken by itself has been an important factor in nearly every life. The return to those favorable natural conditions which involve freedom, with the stimulus of tonic air, and the elements of life and growth produces one of the most important effects upon the physical and spiritual being.

Freedom has been connected largely with the breadth of opportunity represented by unfettered nature. The words "I love thy rocks and rills, thy woods and templed hills" are not the sole possession of American interest. They represent ideals of nearly every land in which the song of freedom has been sung. And they concern elements which do not pertain to childhood alone, but extend much as if youth were reaching into every stage of life.

The principle of growth or movement or progress, as illustrated by the change of seasons, is another atti-

tude of nature which exercises a tremendous influence upon the human spirit. Shelley recognized it in his statement that the "vigorous awaking of spring . . . and the new life which drenches the spirit even to intoxication," were the inspiration of his great poem "Prometheus Unbound." There is probably no one with soul so dead that no impression is made by unfolding spring. And one may perhaps say that there are few in whom the spirit of growth and of continuing faith in life is so strong that they are not influenced by the melancholy days of fall that come as the "saddest of the year."

(3) As a wholly different point of view from those described there may be considered by many what is referred to as "companionship with nature." Byron said he "loved not man the less but nature more." Wordsworth remarked that "Nature never did betray the heart that loved her." The man who is not a poet, philosopher, theologian, artist, may have the same feeling of relationship, never defined, but always in the background, as something valued beyond measure in the scheme of living. Colonel Tallboys in the play "Too True to be Good" remarked: "Humanity always fails me, Nature never."

Voicing of human feeling fits itself in some ways more satisfactorily to the age-long refinement of language than to any other vehicle. Words, rhetoric,

impressionistic descriptions, philosophy, may all be set in harmony with a smoothness of expression. Language flows, and its speed may be graduated. Is there a painting that has expressed in comparable measure the feeling of human relation to nature stated in the opening lines of Bryant's *Thanatopsis*:

> To him who in the love of Nature holds
> Communion with her visible forms, she speaks
> A various language; for his gayer hours
> She has a voice of gladness, and a smile
> And eloquence of beauty, and she glides
> Into his darker musings, with a mild
> And healing sympathy, that steals away
> Their sharpness, ere he is aware.

In the same way the lines of the first two stanzas of Gray's "Elegy Written in a Country Churchyard" represent a personal relation to nature coupled with a description in which the imaginative quality is carried out through a movement of commonplace things relating themselves to peace and repose of the individual:

> Now fades the glimmering landscape on the sight,
> And all the air a solemn stillness holds,
> Save where the beetle wheels his droning flight
> And drowsy tinklings lull the distant folds.

The description differs from the ordinary delineation of a picture in that the sense of movement carries one into regions beyond the borders of vision, so that appreciation depends upon the individual quality of imagination.

(4) From the point of view of art and the æsthetic, features that appeal to the sense of beauty or proportion as interpreted by the artist, whether he be painter or poet, will include elements of harmony and balance in factors which involve line, form, perspective, color, and the symmetrical arrangement of visual patterns. The real human significance of these things has been difficult to define. There is involved the pleasing sense value of elements which present contrasts but do not clash; or which define things of exceptional strength without making them unpleasing. Certain aspects, as color sense, have in themselves deep emotional perception value the nature of which we do not understand fully. Within this group would be included phases of art covered by painting, architecture, and many kinds of literary or poetic expression.

(5) Whatever brings to our attention magnitude, power, majesty, and the laws of procedure in nature tends to develop recognition of something outside our personal experience, something which forms the

matrix of the universe in which we live. Influence of these factors produces a feeling of awe, which in one direction may become fear, or in another is a basis of reverence.

Although there are many references to sublimity in his poems, in discussion of beauty in nature Wordsworth did not often include the sublime. He wrote in his *Guide to the Lakes,* "Sublimity is the result of nature's first great dealings with the superfices of the earth; but the subsequent operation is toward production of beauty; by a multiplicity of symmetrical parts uniting in a consistent whole."

Out of the picture presented by science there has developed an increasingly deep appreciation of what nature means. Upon all this there has grown a philosophy relative to our position in the natural world. The facts of science developed thus philosophically and humanly represent in many aspects what might be called religion.

While the scientist walks with reverent feet when treading paths broken by the humanist, there is always a question whether the wonder and charm of nature as revealed by investigation may not present aspects corresponding in significance to those which have been the objective of interest and creative work of humanists such as painter and poet. Since the sci-

entist is always seeking new light on the unity of knowledge, it might be unscientific not to attempt an understanding of this situation.

From the point of view of the scientist, in our relation to nature there has appeared no lack of either sublimity or beauty. There has been increasing recognition that the deepest penetration of nature possible to the scientist only makes it more clear that we have in no sense attained finality in understanding any aspect of it. The philosophical scientist is left practically with the poet to say, as was said by a distinguished physicist, "The universe is only the shadow of something." Shelley had long ago referred to it as "the shadow of some spirit lovelier still."

It is interesting to note that the sharp limitations set by restricted facts may make an unreal world. Possibly the savage with fewer facts and a free imagination lives in a world in some respects more truly real than that of the stereotyped scientist or philosopher with only his isolated facts.

(6) In some aspects of nature the element of time may be a factor of primary significance, concerning as it does all movement and progress. Nature cannot be appreciated fully if considered only as of a particular moment. The mind is so accustomed to viewing an active world as compared with a static condition that we instinctively recognize the significance of time.

The movement which it represents may be equal in importance to the fact of existence or to distribution in space. It is one of the basic conditions among all the things that we consider in any picture or composition.

Among exceptional opportunities for obtaining an impressive vision of time, the Grand Canyon of Arizona is perhaps the greatest in America, or even in the universe as we know it. Peculiar conditions have preserved and then exposed an almost perfectly maintained record, and have presented it in a frame of magnitude and beauty which helps to draw instant attention, and to make ineradicable imprint upon the mind. With vital reality, the vision of time reveals itself there like the opening of a door upon the past. Even more striking than the contrast of physical grandeur of the Gorge with gullies and canyons we have known, is the comparison of that great chasm of ages with the measure of passing years as we have fathomed them.

For those who go down into the Canyon to visualize the evidence there presented in the rocks, these are places where history not merely reveals itself, but seems waiting to tell its story. This picture represents in the truest sense an abyss in time cutting across the ages.

The Grand Canyon is a magnificent spectacle

merely as magnitude, or as color, or as illustration of architectural and pictorial patterns, but perhaps more than in any other way it has human value as a means of indicating what change, movement, and time are, and how they present a background for all human thought and purpose and planning. Without such an appreciation of perspective in depth or height, or of the streaming movement in the currents of change, there is no possibility of reaching even an approximation to accurate vision regarding great events or affairs, whether they concern nature, mankind alone, or man in the world where he is placed, or even humanity in the world it is proceeding to make for itself.

Now that we know the earth to be round, we look with amusement on those who conceive of life in a flat world. To them there are no heavens as we know them, no wonders of space as we conceive them. Still more extraordinary is the absence of perspective in time in both retrospect and prospect. Many persons lack such a perspective. Their time world is flat—there is no depth—no movement in it.

(7) To have inherited a mind, means that from time to time this mechanism extends itself, and by use of that peculiarly human instrument, the imagination, it carries us out to, or beyond, the limits of our

tangible physical world. And there arise questions as to what lies behind the superficial features in nature that impress us with awe or fear or joy.

In this broader view, concerning what the world really is, nature is sometimes looked upon as only the varied expression of an active principle which shows itself in natural phenomena about us. This vision of nature has been referred to as the view of creation in process. Apart from any scientific aspects, it may represent a broadly religious attitude toward nature.

Chapter II

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OUR VIEW OF NATURE AS BROADENED BY SCIENCE

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IN EARLY STAGES of human history contact with nature was relatively close. With the struggle for existence centered largely on obtaining a living from his environment, intimate acquaintance of man with nature had wide influence upon both practice and philosophy of living.

When social development came to require better appreciation of the habits of human beings, special knowledge of human conduct, as contrasted with understanding of the natural environment, became relatively important. Shifting of the struggle from attempt to obtain a living first-hand from nature, to one involving competition and cooperation with others of our own kind, gave a new viewpoint. So for a considerable part of recorded history the most intensive studies conducted by man have centered upon things other than the world around us.

In the past two centuries exceptional vision of science has introduced a new epoch of discoveries in nature. The contributions of research have been so voluminous, and so fundamental, that whatever the

trend of our thought may have been, there is reason for considering how it is affected by these changes.

This restatement of knowledge of our natural environment through development of the sciences gives a picture of vastly greater scope than that which presented itself to the savage or to his successors up to comparatively late time. Added to the new worlds made visible through recently developed instruments such as the telescope, we find undreamed realms opened by new types of interpretation of natural processes. Such results coming from use of new theories appear in the expressions of natural law seen in modern views of structure in the atom, or in our vision of history as opened through the vast eons that have become familiar fields for study of the geologist. We see comparable results again in such tremendous conceptions as develop out of the idea of organic evolution—and taken together these contributions show us a practically new natural universe. The governing principles known to primitive man remain, but beyond them are immensely widened areas and unexpected modes of action.

Just as fruits of endeavor in the field of human organization have in large measure made possible the degree of intensive impersonal investigation necessary for discovery of the new worlds in natural science, so now the humanist equipped with a wealth of fresh

materials and effective modes of research derived from the relatively easy tasks of natural science, seems entering a further and more intensive examination of man himself. As a next stage in advance of study we may expect bettered understanding of the bases of human conduct, and of the laws which control development of the individual and of society. Among these researches will come those concerning reaction of human organisms to the matrix of nature in which they are placed.

So large is the field of recent advances in science that in this discussion it is possible only to outline a few of the situations in which major changes have taken place. For purposes of simple classification the topics are considered in five groups, as follows:

(1) Nature of matter
(2) New realms of space
(3) Multiplication of natural relations by time
(4) New views of the nature and function of life
(5) Man's new place in nature

Changes in our Views Regarding the So-called Material World

Perhaps in no region is our view of the natural world more profoundly modified by recent advances of science than in those subjects which concern the

character of what has been called matter. Modern developments of chemistry have made clear the existence of an almost unbelievable complication of combinations by so-called fundamental substances. Especially in the field of chemistry of organic compounds, molecules become more and more elaborated, until it becomes difficult to separate the constituents. And yet one comes to realization that even a minute change in certain of these substances may mean marked modification in characteristics of the material and of its functioning.

In the field of physics, extension of knowledge has carried us farther and farther into the intimate structure of basic materials from which chemical compounds are formed. The forces involved in function of the atom have proved to be so clearly fundamental, that in reality they themselves constitute the basis of the atom. Today in a rather definite sense the concrete particles of matter which have at times been assumed to represent the foundation of the material world are replaced by these centers of energy. The resistance of elements in material bodies becomes not just the resistance of solid inert particles, but translates itself into forces which we encounter, or with which we deal in consideration of material substances.

Thus in a measure the material world, as once known, vanishes, and in its place appear energy com-

plexes interlocked and intertwined in their relationships to exhibit a field of nature vastly more wonderful than anything which the universe had previously seemed to present.

What constitutes the basis in origin of the energy or the forces involved in the so-called material world is a subject for which, as yet, there seems no practical answer. The developments of both physics and chemistry have made clear such possibilities of transmutation of elements as suggest that the universe is only a varying expression, in a vast multitude of forms, of a fundamental something which we have yet to define. In this respect one sees nature more clearly as a unit than ever before. It becomes also in a sense only the changing aspects of a fundamental power or force, concerning the type of which we have, if anything, what seems like less definite information than we once believed ourselves to possess regarding matter conceived as different substances each with its specific properties.

Present-day views regarding the nature of matter are based partly upon direct observation through instruments, partly on use of technique which the highly refined mechanism of modern science makes possible. Partly they are due to development of theoretical interpretations representing the framing of facts to form instruments of thought. Our belief in

what we think of as approximations to reality thus attained by science is strengthened by realization that much in the field of modern practical utilization of energy in industry, and in everyday living, is based upon these scientific and theoretical conceptions.

Space in Terms of Physical Extent of the Universe

Comparable to the degree of modification in ideas which we have held relative to the nature of matter is the picture of our present understanding of the universe in the sense of space relations. Development of this aspect of science is due in part to use of instruments, such as the microscope and the telescope, and in part to new theories. The new instruments have contributed partly through development of means for gathering light in the regions of relative darkness which the unaided human eye had not been able to penetrate.

It is difficult to say whether the microscope or the telescope opens the more important view. The telescope reaches out to distances of which we could scarcely have dreamed, and brings the evidence of other worlds and suns and universes of stars. It stretches out space to such an extent that the human mind can scarcely do more than realize that we stand

before a multiplication of distance and of phenomena for which full power of comprehension is lacking.

Demonstration of our world as part of a solar system with other planets moving about the sun, and with the sun as only a part of the vast system of stars in the Galaxy or Milky Way, appears now to have been only a step in appreciation of extent of the universe. Other galactic or milky way systems of the general appearance of the spiral nebulæ extend into space for distances now measured by the path light travels over in about five to six hundred million years moving at the rate of 186,000 miles per second. And yet, we note that as the telescope ranges out to the farthest known nebulæ, the growing dimness of the more remote objects is only evidence that this particular instrument has reached its limit of clear vision. It does not define the limits of space. Whether physics with mathematics and our modern conceptions of space will yet determine an outer range for such grouping of universes is under discussion, but the answer is yet to be furnished.

Turning in the other direction, the microscope also reveals what might properly be called new worlds in specks of material which the naked human eye sees almost not at all. Through the miracle of this device other fields of life and of substances spring into existence. When multiplied by the mass of what is about

us, it produces extension of vision into the small things in a sense comparable to the reaching out of telescopes into the large things of space.

Some one has suggested that in the region between the smallest and the largest things which the human mind conceives—atom and known universe—man seems to stand approximately in the middle area of size, looking in upon one group of smaller objects and out upon the other larger things.

It is scarcely an adequate statement to note that new universes of space have been opened by science. It is important to realize that these are not merely expressions of space relations, but represent practically new aspects of phenomena based upon fundamental laws with which we have had some acquaintance.

It is interesting to contemplate the steps in development of this new vision or new comprehension. We find that the crablike trilobite of the Cambrian seas some hundreds of millions of years ago has left us not only the record of its form and general features, but has also transmitted through the ages some evidence touching its sense of sight. From the structures available it seems that while it had vision, the field of its practical sight was limited to the range of a few feet, and the apparatus for recording or storing these reflections of the world evidently had small capacity. Through succeeding ages the record

of innumerable eyes tells of creatures with increasingly sharpened and widened vision. Now in some measure the difference in range of sight between the trilobite and man of a century or two ago may be comparable to the difference between vision of the universe by man of the age of Cæsar, compared with the present range of sight by use of telescope, microscope, and utilization of the instruments of thought that have opened to us these vast regions.

Space does not permit more than mere reference to a great group of instruments correlated with telescope and microscope. As only one case, the large bulk of data on chemical composition and physical properties made available by use of the spectroscope represents one of the great achievements of modern science. With the telescope and the spectroscope working together, the sun and the stars become laboratories for study of vast masses of matter under physical conditions enormously different from those familiar to us on this earth. We learn of temperatures running into millions of degrees, of dispersion of the elements which constitute the atom into states of matter which we are as yet unable to reproduce in the laboratory, of conditions as to gravitational condensation which seem unbelievable, and yet we know that they exist and fit themselves into the scheme of fundamental physical law as we had previously conceived it.

So, from every angle, the development of our relations to the instruments and theories which reveal space and movement have opened for the scientist an almost endless procession of new visions which one may well designate as new universes in space and action. The outlook is so changed that one may well inquire whether our new scientific conception of nature may not have important bearing upon interpretation of the origin of the physical world and of its relation to us.

The Opening Vision of Time, and of Movement in It

Although not commonly appreciated, the extent to which modern investigations have increased our reach in time, and in comprehension of the element of movement through it, constitutes one of the greatest advances of knowledge.

Appreciation of the past as a stupendous range of events has been influenced to considerable extent by increase in knowledge of human history. Influence has also been exerted by varying types of theories as to origin of the universe, the source of the natural world, and the date of creative activity.

Without the trammels of preconceived or elaborately developed inherited doctrines as to manner of

coming into being of the world, unhindered human intelligence seems always to have asked questions regarding the nature of the past. There is reason to believe that even before the dawn of so-called civilization man had ideas on such subjects which may have been more accurate than some of the stereotyped views acquired in the process of education in comparatively recent time.

The three instruments or lines of development of thought which have produced our great conceptions of the past lie, first, in documentary extension of modern history; second, in archæology, presenting seemingly incontrovertible evidence of human activity in periods beyond our direct acquaintance; and third, in the story of geology and palæontology, extending the reach of vision for almost inconceivable distances into the past.

The records of written history pieced together from many fragments have gradually extended the certain reach of knowledge for several millenniums. There have been frequent gaps, many of which ultimately were closed by overlapping records. There have been frequent misrepresentations or misinterpretations, and we come now to see that history and historical records must in many instances be interpreted not as a full or accurate statement of facts, but rather as evidence of the kind of impression made upon certain

persons or, in some instances, the way in which writers wished to impress others regarding happenings of a particular period.

The evidences of archæology, although seemingly mute, may in many cases give wonderfully accurate expression of a past as it was actually lived.

The extent of archæological records reaches so far beyond documentary history, that there can be no comparison in extent of time. The result of these researches has been to push the human story back through perhaps one million years beyond the date of the earliest known written history.

There is nothing more striking or more impressive in the advance of knowledge relating to time than the evidence that man existed on the face of the earth when its climate and its inhabitants were generally different from what we find today.

The geological and palæontological aspects of the time story are in reality only downward extension of the record as one follows it through archæological history. The sequence of strata forming the crust of the earth was made in all manner of ways, comparable to those in which deposits are forming today. It piles itself up to the thickness of tens of miles. The record of these layers is a guide to the past, the validity of which it seems impossible to deny. Evidences of the manner in which these deposits have been accumu-

lated give us an extent of time which geologists now measure in hundreds of millions of years. What are considered conservative estimates of time with which we have acquaintance show us somewhere between one thousand and two thousand millions of years.

Within this period the changes in form of the surface of the earth as expressed in distribution of land and water, in varying types of erosion, and in nature of the shifting materials at various localities, taken together with variation of expression in climatic phases, give a record so tremendous in evidences of time elapsed and of changes in conditions, that one stands almost appalled.

Remains of life buried in the rock strata as we discover them, like the relics in more recent layers studied by the archæologist, are unequivocal evidence of a vast procession of generations which inhabited the earth for long periods. The succession of ages and of stages marked by these series, added to the records of written history, and to the account of the archæologist, extend our conception of the story of the earth so far that one seems looking through a tremendous series of vistas multiplying almost infinitely the variety of scene on the earth.

The student in this field, as he looks back over these steps into the past encounters the reality of a long sequence of wilderness, each as yet largely

unknown. Each he may explore with a sense of thrill in conquest experienced in the wild and unknown places of the earth today. These aspects of the ancient world exhibit interlocking in long series of events so that all appear as one story. Through the evidence of their sequence and their continuity they interpret the modes of change or operation of nature in time. They are comparable to the unified expressions of natural law as we recognize them in space. They represent a process and a succession which are the basis upon which the present is built, and the future will grow.

This opening to us of the world in time, as it has developed through research of recent years, taken with the changes in our point of view relative to the nature of the so-called material world, and the extent of space, places us in an immeasurably enlarged field of vision and of thought.

Advance in Understanding of the Nature and Function of Life

In some respects the progress of our knowledge regarding the nature and functioning of life has seemed at times to represent relatively less of an achievement than what has been attained in the physical and historical sciences. Viewed from another

angle it may be that while our comprehension of the biological world seems more distant from approximation to completeness than what has been done in other subjects, this is true only because the problem of life is itself a thing of more tremendous complication, and wider scope, than is the study of the physical universe upon which the biological phenomena are seen to be based.

The recent vast extension of knowledge of life viewed from the side of physical and chemical properties has given us a bulk of information concerning the character of the formal physical processes almost infinitely beyond that of centuries past. And yet the nature of life eludes us. From time to time statement appears to the effect that the principle of life is located, and that it will be defined in terms of physics and chemistry. And then we discover that the chemistry may be just chemistry, and the physics just physics, and that the thing which determines life is not in the vial from which the extract has been taken.

Some one has said that with all the evidences of uniformity in operation of physical laws, one seems to find in the biological world a certain instability which may at times be termed elusiveness, which is perhaps the indication of a something traversing principles of physical and chemical law, or not wholly amenable to them as they are understood or defined.

It should also be clear that the ultimate interpretation of even the physical and the chemical functions of life often seems beyond our reach. The nature of the vital processes is as yet only partially known. But the enzymes and the vitamines, and the influence of secretions of the endocrine type, have all shown the tremendous significance of what seem like infinitesimals in the complicated structure of a living being. The extent to which we have come to know how life processes are guided or controlled by these influences constitutes a new world in modern scientific thought.

The story of how life begets life, and of the nature of inheritance, and even in some measure the variation of kinds of organisms, we have come to understand in part. In a measure we see the operation of principles which were almost completely unknown a generation or two ago. The general theory of organic evolution expressing the idea that, as seen through the ages, life developed continuously toward more complicated, more broadly comprehending, and more intelligent forms is probably second to no great conception originating in human history. It contains within itself the potentiality of constructive development for human thought and action.

On the whole, advance in the biological field may be said to rank relatively high compared with

that in other phases of science. We have actually looked into a new world of biology. Perhaps here more fully than elsewhere, we are aware that explanation has only begun. But what has been accomplished in these fields would, one hundred years ago, have seemed almost a miracle.

Changes of View Regarding Man's Place in Nature

It is but a few years since Huxley and others called attention to the fact that man had a place in nature, or that human beings, like life as a whole, have relation to an environment of which they are in one sense a part. It is only within the last few generations that we have come actually to see man as emerging from the wilderness of the past with all its untamed inhabitants. We have just begun to see a clear picture of human kind making for itself the beginnings of civilization.

Extension of studies on the relationships of man into the broader field of anthropology has made it difficult for us to separate human development from that of other types of life. Today, we go back to investigation of other organisms to find some of the elements inherent in human nature. Man is today no less a wonderful being, nor does he have less of

the high qualities called spiritual than in any previous period. He is, however, seen as more closely related to the universe of things about him, from which he has received deep and lasting impressions.

We see also today that something called the environment of man extending itself as it were into the very fiber of his being. Through such relations as the physical activity of his digestive system, or his nervous system, or the influence of almost intangible constituents of his glands, it becomes clear to us either that man and his physical environment interlock, or that the influence of physical features in man is of much larger significance than has been assumed possible.

If, as appears to be indicated by the general theory of growth or evolution, human life fits itself into a broad movement in a universe of enormously increased importance, then there is unavoidable recognition of greatly increased significance of human living. Life of today has taken on largely broadened meaning and added dignity by reason of this relationship. On one hand, we recognize the past as not merely a static ruin without significance to us. On the other hand, we see the future as not merely framed by castles in the air, but as representing the coming of something to be. The place of man in this scheme of development is given increased importance by our

belief in the orderly advance of the universe and its meaning.

In this enlarged plan man is no longer an isolated element living for himself alone. He may with assurance be guided by faith in the integrity and continuity of the past. If for no other reason than because this fits into a scientific scheme of evolution or development, he may accept the reasonableness of hope for the future, and may be warranted in having joy in the opportunity for conduct of his life on the basis of what might be called the cooperative or human program of living in the present.

Conclusions

Extension of our view of nature into greatly widened reaches of space, time, movement, and power has increased our belief in unity of relation and operation of what we find in a manner which at an earlier period one might scarcely have imagined. Universality of expression in what are commonly known as natural laws does not diminish with extension of our range of vision through what is known of space and time.

Assuming that natural laws are only methods of operation, we might look for some deviations. One might, for example, assume that the spiral nebulæ,

floating in the more remote regions in space, essentially as island universes, would fail to exhibit precisely the type or manner of movement characteristic of elements in our own solar system, or of our galactic or milky way universe; and yet—across these great regions there is almost unbelievably rigid adherence to laws which are the rules of conduct for materials as we have learned to know them here.

Similarly, in remote geological time, the principles of physical and biological change, or movement, or growth, held closely to those that operate today. In general, the movements, or changes, or evolution which characterize not only the world of life, but so far as we know it, also the development of form and energy distinguishing the inorganic world, have maintained through the ages the same general type of variation that characterizes recent time. It seems that in all known regions of space and time the evidences indicate a unified world, operating under comparable conditions.

Although the scientist must be both accurate observer and philosophic interpreter of what he finds in nature, he is generally not inclined to extend interpretation to any great distance beyond the materials which come to his hand. While recognizing the impressive significance of fundamental aspects of nature, he hesitates to voice opinion as to the ultimate

source of material or energy involved in nature, or of the power expressed in its movement. He may maintain belief in the processes examined and yet refuse to attempt definition of ultimate origin or goal.

It would be difficult to obtain a consensus of opinion of scientific students as to whether nature, as we know it, is itself a last frontier, or whether something lies behind it. It is possible that, viewed solely from the side of nature, a large percentage would feel that progress of discovery in recent years has tended to make comprehension of the universe an increasingly difficult problem. Perhaps extension of our knowledge has tended to deepen emphasis on the idea that human vision is itself limited, rather than to indicate that man is reaching the boundaries of the universe.

The almost appalling bigness, age, and potentiality of what recent years have made it possible for us to see in nature, may appropriately lead the scientist to inquire whether the terms "design" and "personality," based on our human ideas of plan and personal attributes, are in any sense adequate for what might lie in or behind nature. Perhaps human kind through its attempted interpretation of the universe is merely projecting a type of man-patterned mental conception which will ultimately be considered as not more fully representing the real situation than have the formal

physical effigies of deity which at times have served somewhat similar purpose.

Perhaps it will sometime appear that scientist, philosopher, and theologian, in their ultimate conceptions stand at approximately the same distance from an ultimate goal of interpretation, corresponding in general to that of the poet who writes "How glorious art thou earth, and if thou be the shadow of some spirit lovelier still."

It should be clear that this statement is not an attempt to formulate a philosophy of life out of the influence of nature as interpreted by science. It is intended only to suggest the character of this influence, and to stimulate thought as to its significance.

But assuming that it is humanly impossible to avoid directing attention from time to time toward questions concerning beginnings and endings, it is to be expected that modern views of nature seen through science will have powerful influence upon both basic philosophy and routine conduct of life.

The savage with full appreciation of his relative personal impotence compared with the forces of nature, constructs a scheme of reference for the varied elements about him. One result of such elaboration may be the conception of many warring deities, and the idea of chaotic elements in nature. Somewhere near known beginnings of human history there ap-

peared expression of the idea of unity illustrated in the theological principle of one God in nature. However this view may have arisen, it contained in a sense the elements of unity, and of order, and dependability, so strongly expressed in science today.

Whatever these various views may mean as foundations of philosophy, and in terms of everyday conduct of human life, the idea of law and order expressed in relation to unity and dependability in nature means the possibility of extension of our understanding and the continuance of progress. Our advance seems governed mainly by the extent to which we may come to know the underlying laws, and either adapt ourselves to them or turn them to our use.

The superstition and fear which once governed man's thought regarding great expressions of natural phenomena as seen in thunder, lightning, and rain have changed to a state of mind in which the gods of the lightning have been harnessed to man's service, and the torrents of rain are a source of life in his fields.

With all the boasted progress of our mechanistic civilization and its production of leisure time, there is no contribution of modern knowledge and organization that exceeds in significance the emancipation from superstition, and the establishment of confidence in law, and in orderly procedure of nature as

brought about through information for which science vouches.

Perhaps one might illustrate the importance of this relation to nature through a single concrete example. Within the range of our personal experience the earthquake has been a phenomenon known in business terminology as "an act of God." In terms of theological philosophy, it has seemed to many one of those inexplicable illustrations of activity in which the multitudes who suffer might see the act of a supreme power exerting itself without reference to the well-being of mankind.

Today, without reference to whether the earthquake is or is not classified as the act of a beneficent being, it is seen as an incidental expression of tremendous constructive forces in nature involved in movements of the earth's crust. To these movements we owe a large measure of the value and beauty in diversified climate, scenery, and natural products characteristic of our environment. Also we know that just as man has learned to protect himself against rain, flood, and fire, so, with increasing understanding of the laws which science develops in study of nature, we may evade the dangers inherent in such activities as those of the earthquake, with the kind of assurance that one has in avoiding the danger of great waves of the sea impelled by wind and tide.

In the light of modern knowledge the wonder and power and beauty of the natural world are not less. Beginning science dissected nature into its ultimate fragments, in which the elements of inspiration seemed no longer to have place. Modern synthesis of these materials sees the parts returning each to its normal position in a world more wonderful, and more beautiful than it could ever be without this intimacy of understanding. Increasing knowledge presents the possibility of guiding our lives toward a larger freedom for growth and improvement. This new world of living is opened through recognition of a more fully unified and more dependable orderliness in nature than has heretofore been recognized.

Chapter III

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TYPES OF INSPIRATIONAL INFLUENCE IN IMPRESSIVE NATURAL FEATURES

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THE FOLLOWING six aspects of nature, studied for many years by the writer, are discussed briefly in order to bring out several types of inspirational influence which seem to have special human appeal. The range of subjects used extends from the Grand Canyon of the Colorado, probably the most stupendous natural feature of America, to the small forest of beech trees bordering Adams Mill Road of Washington, D. C. The types of subjects utilized have been chosen in order to point out the varying aspects of human interest in natural features. The selection has been made with recognition of the fact that this variation of interest is considered in other chapters of this book, such as those relating to primitive nature, and love of nature in day-to-day living, and that touching the common interest of all peoples in nature.

It has not been the intention to make each sketch of a natural feature a specific description. Rather has

the effort been made to suggest points of view bringing out important human values in each topic. So, in the case of the Grand Canyon of the Colorado, no attempt has been made to describe the canyon broadly, the objective being rather to suggest some of the points of view most desirable in attempting to obtain maximum value from contact with that region. And again, the coming of spring has been treated as an aspect of nature of outstanding importance and exceptional human value.

1. THE BEECHES OF ADAMS MILL ROAD

CERTAIN phases of nature suffer so severly from changes of natural environment that even small influences bring serious disturbance. Other living things may suffer but still maintain their distinctive characters. Widely distributed and varying much according to conditions, among which is the influence of man exerted upon it, the beech tree seems always to retain that something which distinguishes it from other trees. Although its peculiarities might be described, in part, as irregularities, there is in the tree a combination of sturdiness and charm which has given it a unique place among the natural arboreal associates of mankind.

Wherever the beech is found with human com-

panions it carries those attractive qualities which doubtless stimulated the interest and thought of early man. It has made itself valuable in many ways to users of wood, has sheltered from rain and sun, has served the purposes of horticulturist, landscape artist, painter, poet, and scientist. In many respects it furnishes unusual illustration of a feature in nature that, in spite of varying conditions and changes imposed upon it, has held to its original characters with a persistence that represents both tenacity of life and continuity of qualities developed in long ages of creative process. Just as the primitive jungle rises quickly to tear into pieces an abandoned temple which has pushed back a forest in the tropics, or a scraggly wood may close in slowly over the ruins of a short-lived industrial city of the temperate zone, restoring natural values in a region from which it has only recently retreated, so the beech seems to have yielded in a measure to influences of civilization and of varying environments in which it has been placed, at the same time holding its distinctive original characters.

The beech is one of those living things which bring us to realization that while the primeval world may vanish with time, and the primitive or original characters which grow out of it may be eliminated or changed, what we sometimes call the natural features constitute the source and essence and adaptable

strength that moves nature forward. Through our activities nature may be so influenced as to change the form of its expression or development. We may produce multitudes of varieties from certain plants, but we have not been able of ourselves to make even a humble flower of the crannied wall, such as may be the basis for what are sometimes called creative activities. This tree may, then, have a place of significance among features in nature in that it has laid its imprint upon our thought in many ways and has become an impressive element among things around us which help to guide and formulate our ideas.

The characteristics of the beech could be described adequately only by a form of treatment presenting its varied aspects as they appear to scientist, users of wood, agriculturist, forester, landscape artist, and writer. Each land in which such a study could be made would present its special problems. And if also history could make its contribution, the variety of pictures would be widened.

In some respects the beech is a persistent and defiant tree, holding its own and taking what comes. Often it appears to lack that unity of plan distinctive of its associates of the forest, but sometimes it is tall and straight and slender, and in its mass may show marked symmetry. Its beauty seems not to have been

produced by one swift stroke, but rather to be the result of many efforts.

It is a tree that may adapt itself to rugged surfaces and rocks, often growing where others scarcely can maintain a foothold. With its multitude of roots in a great mat grasping the stony floor it presses into crevices that look impenetrable. Although reaching always toward the sun, it does not each time take the straightest path. Sometimes it sprawls in trunk and roots, as if attempting to keep near the surface of the soil, and its branches droop over the ground like the wings of a mother bird.

The stem of the beech is sturdy, establishing its strength in a great pillar rising from the multitude of wide-spreading roots. In the exquisite modelling of the trunk the buttresses may appear like great muscles shining through a closely-fitting skin. The smoothness and texture of the bark often give it the appearance of silk or satin with a peculiar sheen not found on other trees.

In varying lights the normal, decorous gray of the beech trunk takes on a multitude of aspects. My wife said, "It is a clean tree—blue-gray with silver lighting in the sun." It changes with its surroundings, sometimes deep bronze or black with dusk and the dripping rain, or brilliant green, or the gray of satin

for the afternoon, or silver under brilliant sun or moonlight—and in the mist it has the gray of a specter hiding itself in the shadows.

The contrasts between light and shade and color are accentuated in the beech by smoothness of the bark. One sees often the sharply pencilled shadows of its own delicate twigs marking their clear outlines upon the whiteness of the trunk. Sometimes the columns of old beeches are brilliantly green with long picturesque black streaks or bands marked upon them.

Among the many places where beeches have made special appeal to me, the one best known is a modest grove on Adams Mill Road, leading down to the Zoological Park in the city of Washington. This region I have visited frequently on Sunday walks extending through all seasons over many years.

The beech grove on Adams Mill Road is one of the interesting features in the long area of park following Rock Creek, which brings the quiet of a wilderness into the city's midst. There it is possible in seconds, almost, rather than in minutes to go from noise and danger of crowded traffic into shadows of a wood, where only damped sounds of distant clanking wheels serve to remind one of hurry and latter-day civilization.

So it is that where Columbia Road, Eighteenth Street, and Adams Mill Road diverge, the length of

a block separates a milling business cross-road, from an elm-bordered boulevard swinging suddenly down the slope into the Zoological Park. Street-car lines and streams of automobiles converge and diverge under guidance of unseen hands behind the traffic signals. Permanently glowing, yellow caution lights perch alongside safety stations for those foot passengers whose fraction of a second dash does not permit a complete journey across the traffic stream in one effort. Two blocks distant the grateful shade of a quiet grove brings the peace of nature.

Where the road curves up the valley of Rock Creek it is bordered on the outer side by a low stone wall. It is here that beeches begin to replace other trees. In turning the corner, you meet a fine tree, three feet in diameter, standing almost against the wall. Looking toward the creek one sees mainly beeches.

Just below the turn of the road there is a small cut or quarry with an exposure of rocks of enormous age, a relic of another world in time. The stones are so old that they have nearly lost their original character, and there remain only a few traces of their earlier structure. Such are some relatively resistant pebbles in the mass that still retain their individuality.

Passing down the road, the comfort of at least semi-solitude envelops one. The muffled thunder and the clank-clank, tlat-tlat of street cars are still audible,

but as if from an outside world. The pleasure of reaching the deepening quiet at this place brings often to mind the sonnet of Longfellow—"So as I enter here from day to day and lay my burden at this minster gate, the tumult of the time disconsolate, to inarticulate murmurs dies away, while the eternal ages watch and wait."

Sometimes I stop before the road cutting, at the world-old altar of these rocks which are gradually fading into another aspect of reality, to repeat, "while the eternal ages watch and wait." Once while standing there an airplane drowned the voice of the street cars, and thought shifted to the future, of which the airplane is prophetic, and to the eternal ages that wait, as it were, on the coming of the world.

From Rock Creek immediately below comes the sound of a rapid. On the paths along the stream, now and then a horseback rider passes. Occasional automobiles rush up the road, apparently concerned largely with making it "on high." Others, coming down, roll by almost in silence, except for squeaking springs or the clank of loose bumpers.

Coming by Adams Mill Road to Rock Creek there is never-failing interest in following the stream. Though merely as water it may turn wheels or wash dishes, in winding its way from the source to the sea it functions as a living thing. There is attraction

in its movement, in the results of its effort, and in the inscrutable mystery of its power. The stream is at the same time one of the greatest continuing forces of the physical world and one of the foundation elements upon which life is built. The mystery of its action always presents a challenge.

Writers in every type of literature have attempted to describe the movement and the voice of brook and river. Whoever bends ear to listen initiates a study that never loses interest. The multitude of sounds arising from the water itself, and from the burden it carries, appears as complicated as the expression of an orchestra. Sometimes in the rush of a rapid there seems a single voice like the sound of wind in the trees during a heavy storm, but if you listen more closely it resolves itself into a clamor of individual notes. Where the stream flows more slowly, its sound is puctuated by the movement of individual splashes. Where it glides by yet more gently, there is the continuing mutually submerging rattle of many wavelets, which, in human terms, is often translated into the tinkle and babble of the creek.

The great rocks ranging up to fifteen feet or more in diameter, which one sees here and there in this creek, are blocks of widespread ancient formations over which the stream is flowing. Such separated fragments in the region near by are mainly covered

by other material. Here the moving water has stripped away the soil and decayed rock, and the smaller particles are on their way to the sea. These larger more resistant pieces remaining are also in process of disintegration. Lichens and other plants initiate or advance decay, which is accentuated by alternation of sun and the cold of night. Frost and ice further the process by widening the cracks. Always there is continuing abrasion by the water blast of sand and pebbles.

Often I think of the fact that in a relation such as is shown here, with the stream flowing over these rocks, there are contrasted the most mobile of all changeable things—the stream, and the most nearly permanent of all—the rocks. And yet for what in some aspects of nature might seem a long period, namely, a fraction of a second, the water may appear solid and immobile. As seen through the ages we know that the rocks are flowing away.

Recently I saw scattered here and there among the larger trees of a Giant Sequoia forest in California many titanic boulders. While in some instances relatively recent changes had taken place in surface, and form, and position of these rock masses, in general their appearance and location at the moment were approximately the same as in the days when these giant trees were saplings. And yet in looking at the

forms of the land, and scrutinizing closely the products of decay, the active life of streams flowing around us, and the heaping piles of debris which the streams had carried out upon the plains below, no one could doubt the classic statement of Tennyson, that "the hills are shadows, and they flow from form to form and nothing stands. Like clouds they shape themselves and go, the solid lands." But compared with the life of these trees, the greatest and longest-living of all growing things, the huge boulders seem almost unchangeable, and then we recall the fact that the appreciation of time to many persons reaches scarcely beyond the term of a presidential election—very dimly beyond.

With all the comfort and peace of the woods, the outstanding pleasures of these walks along Rock Creek were those which gave sureness and strength for the days as they came. Soothing as are sunbeams and the balmy air of summer, those souls are safest that can see joy in storm, and carry their own spark of sunshine. We may dislike cold and rain. The bare leafless poles of winter woods may weigh down our spirits. And yet we know that in them lie the angels of spring ready to rush forth.

For some who look into a maze of naked branches spread against a winter sky there is visible only the bareness of skeletons. Others are conscious of what

lies beyond. The lacework of crossing twigs and limbs may have the value of a glorifying screen which like a prism spreads the light into the beauty of its constituent colors—and the evening takes on added loveliness. So we recognize it as a triumph of human spirit to see what is beyond, and in it all to find beauty, real and abiding. It is the triumph of souls to look across and over what seems inert, and to discover beyond something which lives.

In a fierce winter storm I walked up Rock Creek and then along Piney Branch. Only one person was seen on foot. The snow swept down like a wide curtain drawn over the landscape and obscuring the woods. Suddenly the ground whitened. On my coat was laid a two-inch blanket of crystals. Upon the thicker branches of the trees long, narrow, fleecy ridges gathered. Twigs and slender stems drooped with a glistening burden, that shaped itself like new life framed from the wreck of the storm.

Against this matchless whiteness the silver trunks of beeches seemed to take on a darked gray. They stood out against the storm. The branches bent but did not break. Torrents of air spent futile strength, and the limbs swung back to face whatever winds might come again.

On a clear, cold day in February, looking down Adams Mill Road from the turn near the rocks, the

massive beeches were seen naked against the dark background of the farther slope, or silhouetted before the sky, their silvered beauty beyond that of the wood at any other time.

On another occasion in winter it rained gently. The carpet of leaves was almost a continuous spread of red brown, made deeper or thicker by the rain. With the foliage gone the framework of the forest shaped itself more clearly against the sky. Glistening with rain the beech trunks seemed to glow in the dull light and especially in the gray mist of hollows by the stream. Where patches of moss followed the shaded side their green took on a startling brilliance.

The braced and twisted branches spread like powerful arms. As things of strength and beauty the trees seemed poised, as if ready on the instant to launch themselves into the next great act in the drama of living, which was to be the birth of spring.

Walking in the rain for two hours in the spring, the sound of continuously-falling drops was like the wind-borne message of a distant waterfall or a gentle rising wind. There was exceptional sharpness in the sounds and odors of spring. Like the almost incessant call of the flicker, trees and grass seemed to have their own messages of awakening life.

Masses of white dogwood appeared through clouds

of partially unfolded pale green foliage. The green of the beech sprays seen against the background of smooth, gray trunks rivaled the flowers in beauty. The young, partly filled out leaves of the beech had the delicacy of soft silk. They waved in the wind with the faintest breath, or drooped with the slight wetting of mist or quiet rain.

The foliage of spring has high color, but not the brilliance of fall. The leaves at the beginning stage of spring are smaller and the mass of color more delicate. There is also added beauty in the fresh tint of gold as if the new green were laid over sunshine.

On a walk in the fall, the beeches still had their leaves, golden brown to brown, sometimes tinged with green, only a darker shade than that of spring. There was a sharp contrast of yellow foliage against the silver gray trunks. The new carpet for winter was being laid. It was of rolled brown leaves, with rocks protruding here and there, and had a wild, refreshing odor. Green of oak and other shrubs, and the gray of the trunks were projected against it.

On some beeches with yellow leaves of fall, the silver threads of small branches gave an effect of weaving through a mass of gold to form a gorgeous tapestry.

Fall is the time of greatest glory in the wood, the period of fruition, the time of flaming beauty of

maturity. The leaflets which in spring or summer were colored by nature to make flowers, are here replaced by the glory of the tree arrayed in its most brilliant garment.—Ships go down with colors flying. Forests celebrate the approaching twilight of the year arrayed in their most splendid raiment.

Over the years of acquaintance with these beeches one remembers the grove on the slope where Adams Mill Road leads down to Rock Creek as having a mood and a meaning varying with the infinite changes of surrounding conditions. It can have a somberness approaching gloom when the trees are dashed and soaked with rain. Or in the nebulous light of a heavy day the gray trunks almost fade into the mist. They are never twice the same. In bright light and clear atmosphere the brilliant stems and branches have a tint of silver. It was under such high illumination that the beauty of the place first made for me its deep impression, and it remains in memory as the silver forest.

From lower reaches of the hill in winter or in spring the shining branches silhouette against the sky or clouds. As one looks down into the valley in April, their background is the yellowing-green of opening foliage. A few days pass and the gold glint of spring fades to green of summer. With lengthening shadows of the year, the golden brown appears

again. Always the pale trunks stand in quiet dignity —unfailing friends of the restful hour.

2. THE LAKE REGION OF ENGLAND AS SEEN BY WORDSWORTH

THE LAKE REGION of England as known to Wordsworth presents one of the most interesting illustrations of value in nature, seen both as inherent or natural features and as reflecting the pictures visualized by a mind having exceptional ability for discovery of unusual qualities. There are other regions with lakes showing more brilliant color or bordered by more spectacular landscapes. There are none that more consistently carry a reputation for intermingling of charm, beauty, and sublimity, or which seem to present greater human appeal.

It is not easy to analyze the striking or characteristic features of the lake region, partly because the qualities are numerous, and in a measure by reason of inadequacy in our knowledge of what constitutes human appeal in nature. Reference to the lakes in the generally accepted name of the region is evidence that these particular features are of special interest. But the same lakes situated on a similar area of flat land would not have made the region famous. Relation of the lakes to a country of high relief, giving

contrast of the level water and wide, smooth meadows with a multitude of hills and mountains, has produced a picture of exceptional charm. Variation of views of the lakes as seen over gentle slopes of hills and steeper grades of mountains has also made visible many beauties that otherwise would be hidden.

The forms of the land are in themselves possessed of unusual attraction, moulded as they are in shapes ranging from rolling hills to sublime masses of mountains with abrupt scarps and bold, stony steeps. Together these features speak of the earth as in the process of shaping, rather than merely as a theatre for action of dramas concerning life alone.

Relation of the lakes to the landscape is not only something which development of the land forms has determined in accordance with physical laws, but it will be seen by many as illustration of the interrelation of these widely differing features. Not only will the student of geological history show how through the ages this situation has been produced, but the believer in nature as representing a far-seeing program of creation will find in the relation between beautiful lakes and sublime hills what appears to be evidence in support of his view.

With all of the charm and sublimity furnished by water and hills, the Lake Region could not have attained the recognition which has come to it without

the values contributed by its mantle of vegetation, or without the varied beauties of cloud and sky, or in absence of the striking play of light, shadow, and color made possible by this combination. The trees, grass, and flowers of the region are not sufficiently different from the vegetation of other areas to warrant special claim to beauty or interest. But the freshness, often so emphatic as to constitute brilliance, adds itself to charm in form and feature of the landscape in such manner as to accentuate other values. In turn the grace or strength of individual trees, with the beauty of copse, meadow, and forest are all enhanced by the setting or surroundings of hill and lake. The student of landscape may say that by chance nature has here approached or approximated phases of composition such as are created by man. Others may suggest that the picture is shown growing out of the unity or perspective originating in eons of adjustment in nature giving one of the closest known approaches to perfection. Whatever be the answer to these questions, the effect produced here is of superlative interest, both in general features and in details appearing on careful inspection.

No picture of the lake country could attain its maximum value without the varying panorama of cloud and sky. Sublimity and beauty in the moving field of changing masses sweeping over the hills

compete with the most impressive and beautiful features of land, water, and vegetation below. The play of light that brightens or colors or veils the changing mountains of cloud reaches down to imprint its pattern on hill, lake, and meadow through moving shadows or broad areas of sunshine. Here again the observer interested in the unity of nature realizes that what one sees in cloud and sunny sky is in large measure responsible for the features having such great attraction in the world below. Streams, lakes, the shaping of the hills by erosion, and the luxuriance of vegetation all trace their origin to the clouds or to the sunshine. So the picture requires these elements taken together for completeness.

In days when the reorganizing, remoulding influence of man makes doubtful the future of much in nature that we cherish as beautiful in form or in setting, comfort may be found by some in the idea that however the face of the land may be scarred, the lakes changed as to form and use, or the growing things may be restricted as to location or even their nature, the grandeur and beauty of the cloud world will persist as in ages before the mind of man was here to enjoy it.

While strenuous effort is made to retain as much as possible of the original natural elements in the Lake Region, even in Wordsworth's time there was

realization that many things in the fauna and flora had already vanished, and in a measure their places were taken by others introduced from foreign lands. In spite of the disappearance of much that belonged to the primeval world the naturalness of the picture today is of extraordinary value, and should be preserved as an exceptional expression of nature and its moods.

In addition to the appeal of purely natural elements in this region there is here also a deep interest in what might be called the natural modes of human life perpetuated from earlier days. Sheep raising with many aspects of rural life and occupation of man as adapted in natural ways to this environment was looked upon even by Wordsworth as belonging to or growing out of nature. These phases of human occupancy have been seen as worthy of protection, especially in view of the fact that return to the primeval status of nature, or even to that succession from it which we call primitive, appears wholly beyond the ability of man to realize.

This effort to preserve and protect evidences of human adaptation to the Lake Region, along with the natural values, presents an extremely complex problem. In addition to decisions as to how primitive or natural beauty can be preserved while it is being used and enjoyed, it is necessary to distinguish between

the values of old and new among the many kinds of works produced by man. As in nearly all other cases involving study on this type of question, it is necessary to determine what objectives included have to do with impersonal interest in human welfare for present and future, and what are mainly personal matters, each perhaps in itself a natural expression of constructive thought, but not necessarily considered with reference to the broadest relations of the elements in nature.

The result of study on the future of this region will depend on the degree of care used in securing and analyzing data regarding the human interests touched, and on utilization of the information in preparation of a general plan for the whole area. It will depend also on continuing development of interest in these questions by the people, who are the source of authority in any phases of government that may be responsible for organized or planned effort to realize what is desired.

Fortunately consideration of human values expressed in the Lake Region has been the subject of what is perhaps the most careful study ever made of any region with relation to this general question. The exceptional interest of Wordsworth in nature was developed in the Lake country from childhood, extended through a long life, and, as recorded in his

writings, resulted in an outstanding contribution toward understanding of nature. Important it is to recognize the work of Wordsworth as a purely human expression of what seemed to him the values of nature in that country, and of their influence upon him. This was not a special scientific, educational, or social research, but was the recognition of informal relation between nature and an individual with unusual desire to know the meaning of it all, and to translate his experience into language available for mankind.

To the scientist a part of Wordsworth's observations may have appeared very different from a record made on the basis of quantitative research. To the practical man they might be thought far removed from the business of life. And even to the lover of beauty it seemed perhaps that a very different means of expression had been used from that applied commonly in presenting the artistic values of nature. But science now realizes that Wordsworth saw relatively far into many questions concerning relation of man to the environment in which not only his body but his living soul developed. And the artist recognizes the fact that, whatever the form of his writing may be, the poet developed means for expressing truth and relations of great human significance, and also found ways by which his discoveries could be made available.

It would be of great interest to learn how the Lake Region is seen by the large number of people who know it, either from close acquaintance or from casual touch in the course of tourist excursions. Exhaustive statistics would bring out much of use concerning what has been of interest, and regarding the stimulus of this region for those exposed to its influence. In a sense such information would represent measurement of values in the Lake Region. Seen from another position it would be indication of the meaning of nature to the more or less mechanized life of this century. From another point of view it would be a measure of intelligence or responsiveness to the stimulus of great influences or conditions on the part of the people.

In some part such statistics would probably help to separate or define types of human appeal, such as are represented by beauty, sublimity, the adventure of mountaineering, and the appreciation of freedom secured through life in the open. After all is said it would probably appear that Wordsworth experienced and tested most of the elements of value more fully than is true of any excepting very rare individuals. What he saw and felt will, in general, reach a level so far beyond that attained by the average person that his views and ideals will often be looked upon as exceeding the expectation of appreciation by a large

percentage of the people. But when the situation is seen for what it really is we shall find that Wordsworth has not only stated with unusual clearness the attitude of the average person regarding nature appreciation, but he has also, by virtue of his exceptional ability and his long experience, advanced beyond the position reached by most persons interested in nature. And fortunate it is that this study in a region possessing unusual variety of charm and soul-stirring qualities has been recorded in a form combining clear vision of the natural world and of human nature.

In moving through the Lake Region, even without having available the statistics which an investigation might formulate, one finds in the attitude of the people abundant evidence both of a lure arising from the manifold aspects of sublimity and beauty, and an attraction through the freedom of natural life in the open. Perhaps these things will not be analyzed and catalogued as art or science or even specifically as the imprint of nature. Frequently they may be only general impressions, but they are none the less important. The hundreds of thousands who ride up and down on the little lake steamers, the thousands upon thousands who, bareheaded and with packs upon their backs, walk the steep slopes in wind and rain have deliberately chosen this environment as contrasted with mere prettiness of tea-gardens or conventional-

ized pleasures of the town. They may not see it all with the eyes of the scientist watching the panorama of creation unfold, or of the artist who feels in the deepest strata of his being the appreciation of sublimity and beauty, but enough is visualized both to give joy in their immediate experience and to carry into the stream of life beyond an appreciation of values that time and change will not diminish.

In lines concerning meaning in such experiences set down in The Excursion we find Wordsworth writing that:

> Where living things, and things inanimate,
> Do speak, at Heaven's command, to eye and ear,
> And speak to social reason's inner sense,
> With inarticulate language. . . .
>
> For, the Man—
> Who, in this spirit, communes with the Forms
> Of nature, who with understanding heart
> Both knows and loves such objects as excite
> No morbid passions, no disquietude. . . .
>
> His sanity of reason not impaired,
> Say rather, all his thoughts now flowing clear,
> From a clear fountain flowing, he looks round
> And seeks for good; and finds the good he seeks. . . .

The deep influences of the Lake Region extend over England, reach to the colonies, to all English-

speaking and reading people, and must be recognized as a factor of importance wherever the values of nature are consciously recognized. As problems of nature appreciation are more carefully studied the meaning of what appears in this area will help to emphasize the wide need for further development of protection, and the use of this region will be watched with increasing interest. Also it must be realized that growing responsibility will rest upon those who in various ways help to guide or to control future assessment of values, and the means for maintenance of what is available, and if possible the addition to such great human resources.

3. THE GRAND CANYON OF THE COLORADO

IN ANY STUDY concerning the influence of nature upon human thought or feeling there is advantage in examination of the strongly expressed natural values of a region like the Grand Canyon. The Canyon holds its high place among natural wonders partly by reason of a few characteristics which are appreciated by most of those who see them. In part its greatness is due to qualities that have large influence upon the visitors, but are as yet only imperfectly understood. Merely as a chasm combining tremendous depth and

abruptness of walls it commands instant attention and interest of every visitor. The marvelous architecture of cliffs and pillars, the brilliance of color, the swiftly changing lights, the contrast of vertical walls with the level, forest-clad plateau above, all combine to make a picture not only unusual, but seen universally as sublime and beautiful. And yet artists who paint and poets who describe the beauty and grandeur represented there note frequently their inability to define the things that may be of special importance.

Assuming that magnitude itself is difficult to portray, one may yet bear in mind that great artists have attained a considerable measure of success in recording such qualities both with brush and with words. Failure to represent or to define some of the most important features of Grand Canyon which impress us may then be due to neglect of qualities which are outside the realm of height and depth, or architecture, or light and shade and color.

It is not to be assumed that among the large number of great canyons or chasms of the world the Grand Canyon can be given a place of preëminence in more than a few features. It is, however, within reason to view this gorge as illustrating in unusual degree not only the aspects of magnitude in depth and steepness of walls commonly looked upon as distinctive features

of its scenery, but as showing with these exceptional values an unusually intelligible expression of unity in nature. It is also desirable to note that the marked influence of this Canyon upon thought and feeling may be due in part to things which make themselves felt without clear appreciation of the source from which the influence comes.

Unlike a mountain range which gradually unveils itself as one approaches from a distance, until the whole of its bulk appears in nearer view, the Canyon is hidden in a great stretch of relatively level land. Only when one stands upon the brink does the picture appear, and this with unbelievable suddenness. Many see mountains from the base, but few learn to know them from their summits; at the Canyon the whole stirring influence of magnitude in height or depth reveals itself to every one who approaches. The shock of contact is probably escaped by none. To some it may be only a blow that stuns, or which is remembered by reason of the strength of the impact. For most persons it means the opening of a new window into the earth, revealing its nature, the process of its making, and the results of its evolution.

It is impossible to see the structure of the Canyon without recognizing that it is not an original landscape or a static feature. It must be an act of world creation still in operation. The immediate influence

opens to those who have never before seen this vision something of the idea that there is a larger universe, there is a past, there is movement, and a query as to what it all means. Once a man standing apart from the crowd at Grand Canyon confessed that he thought first of *what made it,* second, *how was it made,* third, *what was it all about anyway.* He inquired whether under such circumstances one should begin to frame his thought as to the nature of the world in which we find ourselves, of its significance, and of our place in it. He mentioned the smallness of man, and ended with discussion of the dignity of his place, although it may be small.

One is impressed by the importance of things not sharply sensed as well as by those which appear clearly. Whatever may be true of other places in which we seek solitude and communion with nature, the Grand Canyon always expresses the impenetrability of its quiet. Brass bands and the howling of the multitude might lose themselves in the vastness of its depth and the bulk of its space, and scarcely produce a ripple to the observer on the rim. And yet, as one watches, little storms which wash the slopes, great arcs of rainbows that appear in its depths, the quiet flight of the swallow or the hawk swinging through the drifting air currents, all make us realize that it is a place of orderly movement, and that its

development is not finished, nor is it halted merely because of our presence.

To many the Canyon is characterized by certain aspects of things approaching mystery which conceivably add to its charm. A study of the influence exerted by the Canyon naturally includes inquiry concerning these peculiar values, and the features from which they arise. In this field of investigation one finds the Canyon of especial interest as, with all the advances of knowledge and of understanding which modern research furnishes, it appears that the attempt to explain little known elements in the picture leads commonly to recognition of further mysteries which have increasing influence upon the intellectual, emotional, and spiritual phases of our being.

In practically every mind that focuses attention on the Grand Canyon there is raised instant question as to how so exceptional and stupendous a thing came to be. What were the powers and forces involved, and by what processes did they act? The structure and architecture of the walls indicate that it is something built and sculptured. Was so great a work done at a single stroke, or did the forces of nature as we know them achieve this result by long-continued activity?

The ideas of power, and movement, and time take

their places naturally in such questioning. The effort to obtain adequate answers has involved the long-continued, intensive study of every detail and the relation of these details to each other, which constitutes the process of science. The result is to demonstrate steps and stages in building the walls covering the larger part of known history of the earth. It shows also shifting of conditions from land to sea and back again many times. Represented in the story is a succession of mountains built and torn away to give place to other mountains in their turn to be destroyed. There is presented also a marvelous series of stages in evolution of life so illustrated as to show the sequence and the relative age in unmistakable manner. Out of the fragments of this accumulated mass of materials a river working through ages carved the Canyon.

The element of time alone expressed in the Canyon walls is one of the most stupendous concepts of knowledge. The changes recorded cover much of the story of the earth with the gradual evolution of its inhabitants. Merely the last steps in forming the Canyon required time and power beyond our ready comprehension.

The aspects of time, and power, and movement, and evolution represented in the Canyon may be even more impressive to a large percentage of those who

visit the area than is the magnitude in space or other values which can be described more readily. Their recognition leads one into appreciation of values that may be more important intrinsically than the grandeur of other things so clearly evident. The fact that the painter recognizes the presence of something that does not seem to lend itself readily to presentation with the brush is only an evidence that he appreciates the significance of that which it is necessary to define before the mode of record or presentation can be formulated.

As an agency through which certain aspects of knowledge are pictured, the Grand Canyon may exert a very great influence upon thought and life. It is doubtful whether these phases of grandeur are anywhere else or by any other means more definitely illustrated. With reference to its emphasis on certain aspects of learning and appreciation, it might well be called a temple.

If, as appears to be the case, development in the intellectual and spiritual sense, both in the individual and in the race or group, is stimulated, accentuated, and accelerated by exposure to greatness shown by objects and ideas, then it is important that in the case of the Grand Canyon there be easily available adequate knowledge regarding opportunity for acquaintance with such values.

The Canyon is one of those features or situations through which an educating and stimulating influence may be exerted. The contribution of value is so great, and the elements in such marvelous balance with reference to one another, that every effort should be made to see that they are protected from modifying or destroying influences, and that for those who visit the area there may be both opportunity to discover the things of significance and to see them in the most effective way. This will permit our citizens to appreciate or worship under conditions which make feasible acquaintance and understanding on the highest plane, and with the least possible disturbance or distraction.

4. CRATER LAKE

EXPRESSION of widely differing aspects of natural features is illustrated in striking manner at Crater Lake, Oregon. This lake presents an unusual group of characters, both in peculiar individual values and in combinations, found in a body of water five miles in diameter situated in the crater of a great volcano. Being located in a physical frame composed of elements which made the lake possible, there are set up here unique contrasts of things as sharply different as any that could be found in nature. The psy-

chological or appreciation value of the features compared is so unique as to make this a region of exceptional interest, because attention directed to the contrasts inevitably emphasizes significance of all the elements represented.

In contemplating the spectacle of nature at Crater Lake one unavoidably comes to consider the influence present-day mechanical civilization exerts upon us, which has become so large that we tend to discuss problems of our surroundings mainly in terms of relation to the human environment. But we may not forget that through most of the vast stretch of history nature has been a dominating factor in shaping both our activities and our ideas. Even at a time when the high degree of unity in organization of cities begins to impress us as suggesting great organisms, we cannot avoid recognizing that man is still immersed in a world of nature, and that the influence of this external world upon him is one of the greatest factors in everyday life.

The feeling of man toward nature as influenced by its varying moods constitutes one of the principal elements of interest and pleasure in life. Its significance for the future seems not destined to diminish. To obtain an understanding of these values which would make possible their highest use in human serv-

ice would be a work of exceptional importance. Such a study might involve the whole range of nature, from the most spectacular phenomena of mountain and forest to quiet beauty of meadows, and to the humanly controlled or domesticated features of nature that appear in the simple green plant, or the bright flower in a tiny back yard.

Study of the Crater Lake region presents one of the most important opportunities to advance our knowledge of this great field of investigation. It is interesting to note that in approach to this problem there has been practically unanimous agreement that beauty is the dominating feature. Other elements have been discussed as grouped around the æsthetic values. The possibility of aid to visitors desiring to understand this picture has made necessary examination of the lake and its setting in the light of what seem to be the major elements represented in appreciation of nature.

In this study the infinite combination of impressions in color, form, pattern, sound, and the symmetries or harmonies which they make, leads us into the path of emotional reaction represented by the æsthetic. But we consider not merely how we see nature in terms of light, form, and pattern, we examine it in terms of how we feel about it in the emo-

tional sense. And we note especially at Crater Lake that emotion may rest on intellectual experience as well as upon other materials.

The study of how natural features appeal to us presents unusually significant questions at Crater Lake, as with many exceptional aspects of nature represented, interest seems at first glance to focus on the lake, a thing of rare beauty resting in the circular crater of this great volcano.

With all of the interest attaching to very many features in the extraordinary crater, to the picture of wide regions spread before one, to beauty of forests and the flora of mountain meadows, practically every one is attracted instantly by the compelling charm of the lake. Impressive displays of color may be found in every region of the world, and blue water is a familiar sight. In this particular lake attention is drawn and held by an expanse of blue not exceeded in intensity or brilliance by other lakes or seas, and by its contrast with a landscape especially fitted to emphasize these charms.

The water changes from moment to moment. Shifting air ruffles its surface in numberless ways, altering both color and rhythm of movement. Local wind-flurries sweep across the basin stirring the waves as if by the discharge of countless jets of air, each producing a sharply defined path along the course.

Brilliant green patches about the margins present contrasts which strengthen impression of the broad expanse of blue. Changing clouds mottle the surface with their shadows. The moving sun develops varying reflections from surrounding cliffs.

Perhaps above all these influences which tend to increase values of the scene are the steep crater walls bordering the lake, centering attention upon the water and furnishing striking contrast by a frame which limits and defines the charms of this picture.

Relation to varied aspects of beauty in the lake gives added value to many elements in the surroundings. Mountain hemlock groups along the crater rim are in themselves things of unusual charm, but projected against the lake, or serving as bordering elements of vistas looking down toward the blue water, they acquire added significance, and accent sharply the color of the lake. Cliffs of brown and yellow volcanic deposits around the water might draw attention without their present setting, but in comparison with the great expanse of blue they have increased power to attract.

So in an almost infinite variety of ways features associated with the lake have added meaning by the contrast, and each of these situations changes with hour of the day and day of the year.

Just as no one who comes to the lake fails to be

thrilled by its beauty, so there are probably few who do not raise question as to the striking setting of the picture. How can one account for a wide, deep, clear lake in the summit of a mountain? There is no entering stream, no outlet. Excepting the steep surrounding crater walls, the summit falls away sharply in every direction. What relation can there be between this strangely beautiful water and the unusual mountain?

The answers obtained by every keen observer may be supplemented by observation of those who have spent years in study of similar questions. To one not learned in characters of volcanic rocks it might be possible to mistake some other kind of depression on a mountain for a crater. But careful workers in the region discover the rocks in the walls to be types formed from molten material, like that at nearby volcanoes such as Mount Lassen, Shasta, and other mountains.

We know also that not only the mountain at Crater Lake, but a vast surrounding region, perhaps two hundred thousand square miles in area, is of a type indicating tremendous outpourings of lava. In the midst of this great region of volcanic activity the mountain at Crater Lake stands as an exceptional feature in its structure and history, as well as with respect to its peculiar beauty.

The eyes of any interested observer find the walls surrounding the lake formed by layer upon layer of lava, volcanic ash, wash of streams, and other materials deposited under varying conditions. No one who sees these built up sections of the wall can doubt that year upon year, or age upon age, it was growing from a low elevation to a mountain. Here and there in the ashes are buried stems of trees caught in the heated mass and turned to charcoal, like residues of wood buried in the ruins at Herculaneum. The mountain side is penetrated at several places by solid lavas that in some earlier period oozed out through breaks or fissures in the wall and then solidified. How long this building process lasted has yet to be determined, but it was a time of many changes and perhaps of long duration.

The great crater or bowl that rests in the top of the mountain seems, like the forming of the mountain itself, to have had a long history of shaping. The summit existed in a sense because there was an opening through which the volcano released products from its activity. The vent changed from time to time according to variation in the forces from which the mountain resulted.

Everywhere about the inner face of the crater wall the edges of layers forming the rim seem to give evidence of recent breaking away to widen the opening.

Observations of the scientist have been directed toward solving the question whether this was brought about through blowing away of the top or by falling in of the walls. By one process or another, or perhaps by several ways combined, as the mountain grew, the crater's opening enlarged, until there had come to be this combination of a great mountain with a deep crater five miles in diameter at its summit.

Though we may not know all details in the process of forming the mountain, the broad outlines can be appreciated to such an extent as to give answer to questions concerning relation of lake to mountain. Near the end of one of the most important known periods of volcanic activity expressed in the region of the northwest, this mass was built by the long series of events described. Each stage was a spectacular expression of power and energy translated into movement and heat of the volcano. Forming the present bowl of the crater was a process involving tremendous forces, such as human kind has only partly appreciated.

Sometimes the mountain was a quiescent region of forest and flower-strewn meadows, where swift streams were slowly washing its bulk away. At other stages it was the home of snow fields and glaciers, and again it became the scene of lava outpourings with intervening showers of ashes burying the land-

scape. And when it had been modelled through long action by agencies among the most powerful that man encounters, preparation was completed for a lake such as now exists. By no other known method could this peculiar setting have been furnished. It remained then only to have given, at this spot, such climatic conditions with fall of rain and snow, as now obtain—adequate to accumulate a body of water in the crater without filling it, and yet with seepage such as would maintain its marvelous clearness and purity.

All who see the lake come under the spell of its great beauty, and there are few for whom the story of its coming to be does not take on increasing importance as acquaintance grows. The power and orderly operation expressed in this process of creation develop in us a sense of appreciation corresponding to influence of reactions produced by other elements which we recognize as beauty and harmony.

To one who views the whole range of features having special interest for us in this grouping about the lake the close relation among them is itself impressive. It becomes clear that what nature means to us involves a multitude of things, each in its way influencing our sense of appreciation. And equally important is it that the æsthetic, the sublime, orderly activity, and development or growth, along with those intimate interests that touch our personal life, become most

significant when woven into a pattern in which unity is a dominating element.

5. THE REDWOODS OF CALIFORNIA

Among striking natural features remaining in the unmodified or primitive state great forests present rare combinations of grandeur with exceptional beauty. Within the range of such possibilities it is doubtful whether there are any that exceed in importance the mingling of unusual qualities embodied in the redwoods of California. While the giant sequoias of the Sierra Range represent the greatest bulk and diameter of tree trunks, it is in the Coast Range redwoods that we discover the most spectacular combination of qualities in massive stems which at the same time show the greatest height known to be reached by any trees of the world. With this extraordinary range in size there is coupled a delicacy of foliage making it necessary to rank them with the most beautiful of all trees.

A forest that stands as God made it, or at least represents the natural descendants of such a wood without disturbance in any way by man, has special interest for us by reason of its picturing the free untouched work of nature and its suggesting the liberty that such a relation represents. Primitive nature

of this type has also beauty and grandeur that are less frequently seen in forests that have been subject to human influence. Even beyond the appreciation or love of nature that seems inherent in our souls lies a deeper and more moving love of primitive or natural aspects of nature because they express the unmodified results of creation.

In recent discussions of great natural features there has been much use of the word "primeval," or ancient, in the place of "primitive," or fundamentally natural. Many things in nature are primeval in the sense of representing ancient time. Such are certain sandy strata of the Grand Canyon walls, perhaps two hundred million years old, that still bear the delicate prints of feet that moved over them when the surface was loose sand.

Primeval character is less to be expected in living things, and while "the forest primeval" may be old and "bearded with moss" its antiquity is not of the order of the rocks or of the traces of life which they preserve. But "primeval" applies in a more appropriate way to the redwoods and the giant forests than to other woods. Not only are the individual trees relatively ancient, but the type that they express has maintained itself through ages to be measured probably to the extent of one hundred or two hundred millions of years. The forest as a whole, as it stands

today, is closely similar to some that spread over the northern hemisphere before the principal mountain chains of western North America were finished, and when the life of the earth was in the main widely different from that of today. In that time great, but stupid, dinosaurs were rulers of the living world. There was but little to foreshadow the more intelligent animals of our day. Not only do the living redwoods as a specific type approach closely the life of that ancient time, but there is much in the group of plants associated with them, such as the ferns, which also has this primeval aspect.

The American poet Bryant seemed at times impressed by the expression of age in forests and wrote in his poem *The Hunter of the Prairies* the line, ". . . from dim woods the aged past speaks solemnly." Were it not for the charm of Longfellow's reference to "the forest primeval" in *Evangeline* one might almost incline to think of the redwoods as the most appropriate representation of the forest primeval.

Some years ago the novelist Conan Doyle wrote a fascinating story called *The Lost World* in which are presented the adventures of scientists who discovered a region where in an isolated locality there were said still to exist types of creatures representing the life world of past ages. Safe upon this *island in time,* these creatures continued to live on, while the cur-

rents of time and progress streamed around them. In a more realistic sense the redwood grove, as typified for example by the splendid primitive, primeval forest of Mill Creek, is an *island in time,* where we may go to be thrilled, and to worship, in nature as it was and is—preserved perhaps to show us in the living state some of the grandest works of creation accomplished within the span of time revealed to us by the records of the earth.

In attempting to protect these evidences of the past we are doing what I believe to be one of the great, critical things needed in the world at the present moment, that is, to preserve somewhere something from the original face of nature in such a way that later generations may at least know what the Creator was attempting to do when he made the pleasant lands, and the sublime regions where sometimes men worship. Protection and interpretation of nature in that sense give an opportunity comparable to development of a great art like literature or painting. There is here a thing of primary importance both to intellectual and to spiritual life of the future. Probably nowhere in the world at the present time can this be done so effectively as in the United States. We are just at the end of a pioneer period when we recognize that unmodified nature is vanishing. We have the means, the energy, and the intelligence to do it.

There is no substitute for ideals or idealism in the development of a program of this nature, just as there is no substitute for the kind of idealism presented by Wordsworth, by Tennyson, by Ruskin, and others in matters concerning both relation of man to nature and significance of nature to man. We need at this moment, as much as any country ever needed it, the development of that phase of literature, or shall I call it that phase of science, which makes clear the influence of nature upon intellectual and spiritual life.

We need today an integration that involves science, the arts, and human interest in order to give clear expression to what is most significant in our relation to nature.

We can conceive of no period in which the kind of effect that might be produced by such integrated knowledge would have greater meaning than in a time like this, when the healing values of nature may exert an exceptional influence.

One of the most striking groups of values of the redwood forests is expressed through the extraordinary effects produced by sunlight touching the trees. This may be true either in groves of the cathedral type or in those characterized by more dense branching of the younger trees.

The kind of effect that appears in light upon the

leaves shifts so quickly that qualities of the picture seem to move. At one moment the lower foliage of a tree may be of a green so dark as to appear almost black; at another moment the slanting rays passing through it may have the effect of what Shelley is perhaps describing when he refers to the "emerald light of leaf-entangled beams."

But rarely do we find a range in play of light comparable to that seen in looking out from the inner reaches of a redwood forest. Crowded shadows of titanic pillars are contrasted with a continuously changing illumination that begins as sifted flecks of sunbeam heightening the copper-red of tree trunks or the red-brown in the carpet of fallen leaves, and extends to the flood of light that covers the summits.

Alders and maples bordering the stream form a screen which, as one looks out through the slanting sunlight of morning or afternoon, produces an effect of luminescence heightened by semi-transparency of the leafy masses. The glowing clouds of gold-green foliage vary from branch to branch, and with the shifting lights of each passing moment. Seen through the great depth and height of shadowy avenues there is a peculiar beauty in the changing patterns, and in the accentuation of color where it is contrasted with deeply shaded pillars of the larger trees, or with the delicate blue haze of a distant canyon.

As the eye swings upward through crowded trees of the dense forest, feathery lower branches give the columns a decoration of rare grace. Where but little light touches them, their green is extremely dark; under play of sunlight the foliage becomes golden green or brilliant green gold. The contrast of these varying shades with the somber trunks shows an almost limitless range of beauty.

Looking through the tree tops there is a vision of the magnitude and beauty of the forest scarcely discoverable by other means. The clean tree stems are surrounded by limbs at one hundred to two hundred feet above the floor. The mass of foliage rises one hundred or more feet farther. The delicacy of the topmost plumes is heightened by distance till they take on lace-like texture. Moving gently they touch across the openings, producing continuous play in the light that streams or filters through. Lifted into a zone of quiet they take on a dignity upon which there may be no intrusion. Beyond is the infinitely changing sky, brilliant blue seen through interlocking branches at mid-day, and with indescribably delicate tints when level rays of morning or evening sun sweep over.

Standing in the deep forest among great pillars that are a real expression of strength and stability

resulting from eons of creative moulding, we look out through the living canopy which they support and see their growing plumes stretching on into the light.

One cannot avoid the feeling that there is in this view something comparable to a vision through the avenues of time from past to future. Out of deep shadows, from the midst of surroundings like those of other ages, we look through the long sweep of trunks standing like monuments, and see beyond the crown of verdure which is their living present.

Excepting man the remainder of the universe lives mainly in its own present. Man lives largely in worlds which he creates—past—future—or without time relation. His world may be merely something he creates or it may be a vision of what actually exists elsewhere in space or time, past or future. The avenues by which he looks out upon the world in space and years are numerous. The occasions are not common on which he views actuality without distortion of past or future, and recognizes the significance of the vision in terms of the drift or movement of time as it concerns him.

Framing of the windows through which he looks has much to do with the reality and significance of what he sees. The vision of the years presented by the redwood forests is one of the most important found in all nature.

Woven through the picture of the redwood forest is an expression of time transcending the imagery of art. Here this sense of the ages with all it implies of movement makes itself felt as it can rarely be experienced. Fantastic shapes of architecture in an ancient castle, by contrast of form, may tell us of other days. The gorge cut by a stream suggests a work begun ages ago. But pillars of living redwood trees connect us as by hand touch with all the years through which they have lived. The time they represent is not merely an unrelated, severed past. But like the column of the redwood it is something through which living currents of the present move. Layers of the trees that were coming into being when Columbus landed still perform their part and make possible the plume of foliage lifted into living sunlight of today.

> Time is a moving stream in which the present floats.
> Trees are springs of time flowing from the past,
> Springs of time that still flow on.

One realizes here that the mysterious influence of the forest arises not alone from magnitude or from beauty of light filling deep spaces. It is as if the stream of time swept through the trees in twisting eddies which by their movement hold together past and present, creating in the atmosphere an element

more subtle than light, but not less real to the mind, and with a penetrating influence that seems clear reality.

In a redwood forest as at few places our thought turns irresistibly to look on the meaning of the past, with question as to its relation to present and future. The living forest itself carries a message significant beyond that of any work modelled by human hand. Considered in its wider setting it opens into the past a deep vista, before which no one can stand without experiencing something of that illumination of soul which left its glow upon the face of Moses when he conversed with the Lord on Sinai.

In the great forest regions of the world one hears frequent discussion of similarity between forests and temples. But probably nowhere is this mentioned more commonly than in the coast redwoods of northern California. Frequently these remarks indicate a reverential attitude toward the forest because of its similarity to a temple. In reality not only did forests precede temples, but it is the forest that has given character to the temple rather than that the inspiring values of temples are found to be revealed in forests. When in his forest hymn William Cullen Bryant wrote the line, "the groves were God's first temples," he made a statement which was completely accurate historically.

6. THE COMING OF SPRING

IN THE HISTORY of life as we know it within the short span allotted to human beings, the outstanding feature in succession of living stages in nature appears in the coming of spring. This great phenomenon ranks above all of our especially selected and protected natural areas or regions such as parks and reservations set aside to illustrate major aspects of the living world.

When we examine the expression of spring over the world we note that in the tropics, or in other words in regions where seasonal variations are not relatively sharply marked, changes in the living mantle of the earth are less strongly contrasted than in the temperate zone. As we move up and down over the earth, modification in the environmental conditions due to influence of season is one of the outstanding factors in the phenomena of spring. These changes are accentuated by many things, and in the case of plants it is reported that some do not germinate satisfactorily until they have been subjected to influence of relatively low temperature.

Among the most magnificent features of spring it is important to consider the variation in different areas of the world. In regions of the north, with long days permitting reception of a relatively great amount of

heat from the sun, flowers in large masses seem almost to shoot into being. So, purely as a biological phenomenon which might be classed with a great number of things that make up the materials of botanical study, spring may be given a place of importance. In phases of applied botany as in agriculture it has tremendous significance.

In places and periods not characterized by influence of such trivial things as those of modern mechanical or social type that have come to absorb so much of our attention, it is interesting to note that certain of the major occasions of life have been based upon, or have reflected, phenomena of nature of exceptional physical and spiritual significance. So, great festivals observed by so-called pagan peoples have included that time of the year which we call Christmas, when the shortest and darkest days of the year are succeeded by those showing gradual lengthening, bringing influences favorable to the spirit as well as to the body. That later turn of the year, which we call spring, when nature revives, and new life appears in abundance, characterized in general by resurrection of life and beauty, comes also to have enormous influence upon the thought and mood of humankind. This point of view we find expressed in much literature, as is illustrated by the Scriptures in the "Song of Solomon," second chapter, verses 11 and 12:

For, lo, the winter is past,
The rain is over and gone,
The flowers appear on the earth;
The time of the singing of birds is come,
And the voice of the turtle is heard in our land.

As illustrating the manner in which our point of view may be shifted to fit particular conditions, it is interesting to note that one may hear on Easter Sunday wonderful sermons on the Resurrection of Christ preached by ministers standing in great banks of spring flowers, often without even a reference to the fact that every year a resurrection of tremendous influence is affecting the world of nature, or the living mantle of God.

The influence of spring upon literature may well be illustrated by reference to Shelley's prose introduction to his great poem, "Prometheus Unbound," in which appear the words:

This poem was chiefly written upon the mountainous ruins of the Baths of Caracalla, among the flowery glades, and thickets of odoriferous blossoming trees, which are extended in ever widening labyrinths upon its immense platforms and dizzy arches suspended in the air. The bright blue sky of Rome, and the effect of the vigorous awakening spring in that divinest climate, and the new life with which it drenches the spirits even to intoxication, were the inspiration of this drama.

To some extent one may assume that the argument of this poem, leading out from Shelley's thought as expressed above, influenced the shaping of those immortal lines near the close of the poem that have been so important to the world.

> To suffer woes which Hope thinks infinite;
> To forgive wrongs darker than death or night;
> To defy Power, which seems omnipotent;
> To love, and bear; to hope till Hope creates
> From its own wreck the thing it contemplates;

In addition to the stimulus that spring gives to life and hope, and the evidence which it furnishes regarding the vital developing movement of life, it is also worth while to recognize, both as a biological contribution and as a great human value, the connecting and supporting relation that spring furnishes between conditions of the living world as we view it from day to day and the greater scheme of movement and progress presented by the universe seen in the process of evolving.

Some years ago, one whose name I do not know published a series of stanzas of which one voiced confidence in the ultimate values and outlook of the universe. It was presented in terms of our attitude toward spring and toward the fading splendor of autumn woods. In a manner it expressed the longer vision of

those penetrating minds that see in what might appear to be waning glories of humanity only a stimulus to further effort. It indicated recognition in the world about us of evidence that, in spite of minor fluctuations in movement, the universe is essentially progressive.

The theme of these verses concerned *destiny;* with spring, summer and autumn contrasted. The first touched the influence upon us of that miracle of miracles, the opening of spring. As paraphrased it reads:

> Who walking in the spring may see
> Fresh green upon the poplar tree,
> And smiles with hope as he goes by,
> Begins to see his destiny.

The last lines, relating to autumn read:

> He who can see the glory fade
> From noble works that God has made,
> And keep faith fresh in his soul's eye,
> Is master of his destiny.

Those who visualize most clearly the greater story of mankind, with its record of development from age to age, and recognize also the significance of that great progressing movement seen operating through all history as we know it, are in position to evaluate and appreciate the evidences of continuity and of

progress in aspects of the world which at a given moment may not seem to express our ideals.

The evidences of what is here discussed are all about us, on the face of the land, and in the creation story of the earth remaining as it was originally shaped. The instrument through which this can be seen and appreciated is furnished by the human mind. Perhaps influence of the unfolding or resurrection of life through spring may stimulate us all to recognition of those great and comforting lessons which Nature presents as at least partial foundation for an abiding faith.

Chapter IV

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PRIMITIVE NATURE AS AN ESPECIALLY POTENT INFLUENCE UPON HUMAN LIFE AND THOUGHT

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IN STUDY concerning the effect of nature upon human thought and feeling there seems no doubt that unmodified natural features exert a greater influence than is true of phases of the natural world which have been changed through human activities. Once we reach a stage at which nature is recognized as representing forces or laws expressing the character and activities of what is behind the world then it is evident that unmodified nature gives us the clearest and most direct vision of the basic elements of the universe about us.

Seen from another point of view it is important to realize that regions of primitive nature tell us relatively more that represents history of adjustment among the features included, while regions modified by man show a distinctly lower level of coordination or unity or advance in nature due to the fact that

interference by man disturbs the relations between natural features as adjusted through millenniums of interlock.

Rapid destruction of much that represents the finest elements in nature has helped to impress upon us in recent years the real meaning of these values. While a considerable percentage of mankind may have lost interest in beauty and other humanly attractive qualities in the world about us, the overwhelming majority seems still to cherish opportunity for enjoyment of our unmodified natural surroundings. Though it may be difficult to determine whether this relation is part of our heritage from long and intimate association with nature, or whether it arises from a newly developed sense of appreciation, there is evidence of pleasure derived from touch with original elements of the world in which we live.

Rejuvenation of interest in our natural environment expresses itself in many ways. It may be directed toward appreciation of basic elements of nature as seen in the symmetry of a crystal, or in the living qualities of a flower in the crannied wall. Some may turn worshipfully toward what seems to express the genius of creation in our infinitely complex universe viewed as a whole, or perhaps illustrated in fragments still remaining as they were formed originally. Others may look upon nature as represented largely by what

man does with such materials as he can rearrange according to his own ideas.

Each of these kinds of interest in nature is important. The idea of growth or beauty as we know it in the simple wayside flower probably contributes human value for as many people as is found in any other aspect of nature. The qualities appreciated in these simple things correspond to what is expressed in the better thought of leading philosophers concerned with the world about us, such as Wordsworth, Goethe, Shelley, and others, who have given high value to understanding and love of what may seem the simplest things observed in the world as we see it.

Those who look with special interest upon features or areas of nature in the primitive state, or just as they were created, may feel that such illustrations present the nearest possible approach to acquaintance with the substance, the mechanism, and the movement of creation. It is not difficult to understand how the unfathomed depths of being and power, and the living processes seen in nature may produce in us an expression of reverence of the highest order. While some may say that in a world characterized by human activities the most important place should be given to the work of man, other careful students will hold that the ideas of man are largely re-statements or

reflections of what is around him or speaks through him.

Considering utilization of natural materials from another point of view, we find landscape art presenting a tremendous field for creative effort. But one may not overlook the fact that, in this case, nature is furnishing elements with which to express human ideas. These features are useful and wonderful and beautiful in themselves, but the grouping and organization are developed according to what the artist conceives as desirable arrangements.

Recognition of the constructive or creative capacity of human kind as an important new factor in the world makes it desirable to utilize as fully as possible this means of bettering conditions and opening new opportunity for accomplishment and enjoyment. Appreciation of the value in human creative activity does not, however, require our assuming, forthwith, that man's knowledge, productive ability, and wisdom are so comprehensive as to eliminate desirability of maintaining in the natural world full representation of the vast complex now existing of materials, laws of operation, and modes of growth or evolution through which creation has expressed itself. So, while, from time to time, we replace natural products by man-made creations, or through reorganization of

natural materials, we realize that what we do not know about many seeming infinitesimals of the surrounding world may represent a volume of fact almost as great as our total knowledge of all other things combined. Also we realize that a large part of what is comprised in our ideas as to fitness and beauty represents often only a reflection of features in nature already impressed upon us through long acquaintance with them in the eons during which mankind has been in intimate touch with the natural world.

Considering the limitations of our knowledge, one must expect a vast period to elapse before we can even discuss the possibility that man's constructive, creative ability be recognized as sufficiently advanced to justify our assuming that we can afford to neglect the opportunity to make acquaintance with conditions of being and modes of operation representing nature uninfluenced by man.

With our vision of conditions in nature defined as they are, we recognize three states or conditions obtaining in the natural world. These may be described as: first, the "natural," representing conditions of nature, or its normal outgrowth, as determined by natural laws; second, the "artificial," or nature under the control of man; and third, those situations which are unmodified or "primitive," representing original

states of nature just as they have come into being, or the succeeding stages in their natural development uninfluenced by man.

It is desirable to note that, while forces impinging upon the "natural" may leave it a product developing according to laws of nature, where artificial disturbance of balance occurs in the "primitive" it is thereby shifted to the class of the "natural," and may never be returned to a condition identical with that in which it existed as something undisturbed. It will always be instructive to study the impinging of new forces upon primitive growth. Experiments of this type will have great value, but the significance of such investigations will depend, in considerable measure, upon knowledge of what nature does without influence of such factors.

Recognizing the situation as it exists with relation to the several conditions or states of nature, it is important to examine the opportunities presented in each case, and the possibilities with reference to present and future needs. Leaving for others the vast field for creative effort offered through use of humanly controlled nature as we may see it in engineering, agriculture, landscape art, and related activities, it is the objective of this particular discussion to direct attention toward the types of use and protection of primi-

tive nature which may permit maintaining the maximum values for human application and appreciation.

The human values realized by use of the primitive in nature include those of the purely scientific type represented in origin and advancement of knowledge incident to learning what nature really is. They comprise also the economic applications of knowledge for purposes such as those of agriculture or mining. They include the contribution to development of values realized in pictorial art, poetry, and the whole range of influences represented in the broader view of art. The effect of greatest significance is that which leads to an inspiring influence tending to broaden thought and to place upon a higher plane even our ideals and aspirations. It is of course not to be expected that all of the types of influence mentioned arise from every primitive feature or area.

In such a reservation as that set aside by the Belgian Government in the Congo region of Africa the scientific, economic, artistic, and inspirational aspects are all strongly expressed. On the other hand, a stretch of undisturbed or primitive wild grass in our western plains region may have scientific, educational, and economic values of a high order, but may lack pronounced influence in the field of the artistic or inspirational. A great natural stone column like that near Shiprock, on the plains above Gallup, New Mexico,

may furnish scientific data; it may inspire us, and it may present real æsthetic values and yet give little of economic importance.

It comes about, therefore, that in the effort to determine the values and utilization of primitive areas there are naturally many methods of reservation, protection, and use. Large areas of forest are set aside by national and state forestry administrations. Regions with a wide range of values are preserved by nations, as in the Belgian Congo park or in national parks of the United States. In a multitude of cases private initiative, and non-governmental institutions, have played important part, as in the maintaining of personal estates carried at large financial sacrifice, in order to guarantee continuity of guardianship for primitive areas having special interest. The Ecological Society of America has conducted a vigorous and effective campaign for protection of areas representing various kinds of life. The Save-the-Redwoods League has persistently followed a specific program for maintaining values in the redwood forests.

Recognizing the situation as it exists with relation to the several conditions or states of nature, it is desirable to consider the importance of the opportunities presented in each case and to examine the possibilities in each with reference to present and future needs. Leaving to other means of presentation

the consideration of opportunities offered through use of humanly controlled nature, it is the objective of this discussion to direct attention specifically to requirements on one hand for such use of the primitive in nature as will give the maximum values for human application and appreciation and, on the other hand, will give the protection necessary for guaranteeing maintenance of the primitive in such measure that none of the values may be lost to knowledge or to human enjoyment.

Some of the reasons for consideration of this question are given in the fact that apparently part of the loss occurring today is due to effort assumed to be directed toward preservation. If this be true it is desirable to face the situation for what it really is and, if possible, find a solution of the problem.

The connection between studies having as their objective the advancement and organization of knowledge in what is commonly recognized as scientific research and the types of investigation which concern protection and appreciation of nature, may appear so slender that there is need for explanation when one shifts from the clearly defined regions of research to the less sharply limited areas of thought concerning human value. The apparent shift from research to human interpretation may, however, be appreciated so far as it touches an apparent change in point of

view of the writer if consideration is given to the fact that a palaeontologist, concerned with the laws of nature as represented in a wholly primitive and unmodified natural world, finds it difficult to avoid expressing opinions concerning the influence of man upon a world which existed in the vast ages of evolution before his coming. If there be any group of those who study nature in which one might expect insistence upon opportunity for maintenance of the values developed by long periods of evolution or creation, such a group should be found among those devoted to study of the history of life and of the laws of growth which come to light through such investigations.

The relation of science to protection and use of the primitive necessarily involves both the advance of our knowledge concerning what the primitive world includes, and development in our appreciation of nature as it may be expressed through various forms of art, or by influences of an inspiring type.

The progress of science in gathering information regarding all aspects of the natural world is a phase in the advance of knowledge second to no other forward movement in the history of mankind. So vast is the volume of data gathered that one seems almost to face new worlds of nature. And yet the materials which we may still expect to obtain from nature in

its primitive state are probably greater than all of the data secured up to the present time. Of information still to be obtained, especially important will be data concerning relations between elements in nature which have been adjusted to each other in that almost infinite time during which the natural world has been in process of evolution. Whether or no these relations are the result of trial and error, they represent the outcome of a process through which factors have been fitted to each other in such manner that they exist together to mutual advantage. In one sense this relation is expressed by the term "unity of nature."

In study of the meaning of the primitive, relation between appreciation of nature sometimes recognized as purely æsthetic and that based upon scientific knowledge is illustrated in interesting ways in examination of regions such as Crater Lake and Yosemite Valley.

At Crater Lake the outstanding quality of the landscape is commonly considered to be color value. The marvelous blue water presents one of the most unusual known masses of brilliant color. Only rarely do visitors mention other qualities as more important. The value of the color picture at Crater Lake is determined in part by contrast between beauty of the water and the steep, dark walls of the crater in which

it lies. But it is not alone the walls that furnish contrast enhancing this beauty. The eye of science viewing the present structure in the light of its history, shows us the mass of the mountain as made up of lava layers which could have come into their present state only as flows of molten rock. Alternating with these layers are strata of volcanic ash, accumulated wash of rain or streams, and materials deposited by glacial ice.

Merely to know that there is visualized here the building of this mountain brings before the mind a long succession of events, including the evidences of catastrophic power of a great volcano shaping itself through the ages to form a crater five miles in diameter in which the present lake rests. The peaceful beauty of the lake is not contrasted solely with the steep, dull-colored walls of rock as they would appear in a superficial picture. Knowledge of what the walls represent means that the quiet and beauty of the lake are contrasted with the results of time and building expressed in many extraordinary natural processes reaching their climax in the tremendous heat and activity of a great volcano. The elements of contrast and of balance in the picture of Crater Lake include not only color, line, pattern, and mass, but, inevitably, the mind acquainted with the situation as known to science, brings into the picture the story of elements

of time and change and power. All of these features are included in the composition of the scene as it presents itself to human interest and feeling.

At Yosemite Valley the situation seems wholly different from that at Crater Lake, and yet in some respects there is resemblance. Yosemite differs from many mountain landscapes in that the scenic features are cut into the nearly homogeneous medium of granite. While at Grand Canyon the eye is attracted by elements of horizontality in differing types of strikingly colored rock layers, at Yosemite evidence of accumulation of stratum upon stratum is absent. Geologists inform us that the granite into which Yosemite was carved originated in great masses of molten material intruded into deep regions of the earth's crust at a remote period. Slow cooling and crystallization of this melted mass at great depths gave the peculiar structure of the rock.

Ultimately exposed to the atmosphere after uplift and a long period of erosion, the granite of Yosemite produced a medium from which unusual land forms could be cut. Rarely may one find practically vertical precipices as simple and impressive as El Capitan. In the pictorial sense what we see is not merely height or the superficial element of design, but with these are the factors of mass, weight, and power. As one looks out over the region about Yosemite the vision

of science enables us to appreciate the scenic and artistic significance of the peculiarly favorable medium for sculpturing of a landscape. The striking values in this great hall of cyclopean sculptures are not diminished by knowing that they have been made possible by even more tremendous movements of molten rock than are illustrated in the story at Crater Lake.

The elements of magnitude and power, expressed in events that led to forming the great bulk of practically homogeneous rock out of which Yosemite was carved, may in themselves be more impressive than any value appearing in the superficial characters of Yosemite today. It is to presentation of this picture that we are led by the vision of this region through the eyes of science. By this process our interest and appreciation are not diminished.

The elements of natural beauty in their pictorial or artistic sense are frequently accentuated by contrasts giving heightened meaning to special characters. At Crater Lake the values of the quiet and brilliant sheet of water are made more clearly evident by the steep surrounding walls of rock. At Yosemite the massive vertical cliffs have their qualities enhanced by contrast with the lyric beauty of a horizontal valley floor characterized by charm of meadow, grove, and stream. The contrast between level floor and ver-

tical cliffs is scarcely greater than the difference between the forbidding steepness and mass of the rock walls contrasted with the beauty of meadow and stream.

So striking are these differences at Yosemite that even the student of physiography or land forms is startled to find there that to him seemingly impossible combination described in Bryant's *Thanatopsis* as "The hills rock-ribbed and ancient as the sun,—the vales stretching in pensive quietness between;" Strangely enough, development of a horizontal element has been introduced at Yosemite, as at Crater Lake, by the presence of water. In the case of Yosemite, the water formed on the floor of the valley behind a mass of glacial deposit. Slow accumulation of stream wash produced the present horizontal floor, forming so sharp a contrast with the steep rock walls, and making possible the meadows which stretch in pensive quietness between.

Even without knowledge given by science, appreciation of the qualities in Yosemite extends far toward obtaining full value of the features presented. But the eye of science picturing the structure and looking into history, gives us the story in such manner that the æsthetic beauty is not diminished, while the element of sublimity is vastly strengthened. If one separates here the lyric beauty from values of sublimity

in considering what constitutes appreciation of nature, a division may be made between what is derived from line, pattern, design, mass, and balance as presented by æsthetic concepts, in contrast with what is derived from science. But if the element of sublimity is included in the group of features that impress us in appreciation of nature, then the one who views Yosemite through the lens of science, as well as in terms of human reaction to beauty, has the advantage of a wider and deeper, and perhaps one may say, emotionally more intensive, experience.

In considering the contrast of qualities in features of Crater Lake and Yosemite described above, it is important to note that the special contribution of science to the picture consists largely of elements which are inherent in the situation, and represent basic characteristics of both regions. These qualities are of such a nature that they are not susceptible of material damage by man, and may be looked upon as primitive aspects of nature which exert a profound influence upon us.

The situation presented by comparison of the varied qualities shown in landscape features of Crater Lake and Yosemite contributes a striking illustration of the powerful influences exerted upon our thought by primitive aspects of nature.

Chapter V

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APPRECIATION OR LOVE OF NATURE IN DAY-TO-DAY LIVING

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IN THIS so-called age of machines, thought tends to center upon mechanical elements arising from human imagination. What we have created engages attention not only in our work, but in our recreation. Yet with all the importance of these advances, we may not neglect the deep and continuing influence of our natural surroundings as it affects us in day-to-day living.

One of the most significant movements for bettering opportunities of life in America today has as its objective the wider appreciation and enjoyment of nature. It is an effort to bring more pleasure into living through better understanding of our surroundings. It is based on the assumption that a clearer vision of nature will enhance the joy of living. It is believed that this view should include both fuller scientific interpretation and higher artistic appreciation.

Science will neglect its opportunity if it merely

heaps up facts without giving them their true value in the world of human interests. In its early stages science tried to dissect the world into its ultimate constituents. To some, these elements have seemed in the process to become largely materialistic.

But now, with development of science and understanding of nature, our vision extends to deeper reaches and over a wider field. The elements of appreciation which have been so important in literature are expanded almost infinitely by modern discovery. In corresponding measure we see the emotional reaction to the intellectual stimulus from nature building itself to higher levels.

The recent movements to widen opportunity for outdoor life and the appreciation of nature as represented in creation and organization of City, State, and National Parks has been an important contribution. But as yet relatively little has been done to direct attention to those fundamental aspects of nature outside the field of mere physical recreation. The time has now come to utilize all the means available for directing interest of the public to the artistic and inspirational aspects of the world in which we live.

As part of a program for opening the way to fuller use of these possibilities it is extremely desirable that we have a clearer understanding of the situation and a better statement than has thus far been available.

No broad movement concerned with the development of either science or art in our country can overlook this possibility. It offers opportunity to influence a vast number of people continuously, and to carry its effect in every direction, ranging from high inspirational enjoyment of the outstanding features, down to appreciation of the minor things with which we come in contact in everyday life.

While human ideas and ideals must be developed imaginatively they must rest upon facts. It is a portion of the duty of science to help in building toward a more clearly interpretable knowledge of the natural world about us. Such a vision of our surroundings would be of value in day-to-day living.

One of the great objectives of educational work should be the development of proper balance between a vision of the world as expressed in the form of facts and measurements, and the understanding of it in terms of human appreciation. One who not merely sees the physical features, but has some knowledge of the factors which may have produced them, has an emotional reaction greater than that of one without this acquaintance.

Although the deeper aspects of human life are among the greatest of all subjects to be presented, the enormously varied and impressive elements of our natural environment make up a large part of the

picture in our lives. It is upon certain of these features that some of the greatest contributions of human expression have been built in literature. This is done by framing a picture of our relation to nature in a manner making interpretation possible.

It is my view that the great value of outstanding phenomena, such as those of National Parks, does not lie merely in their influence for the moment. It consists rather in what might be called permanent reorganization of elements of the mind in such manner as to give a new view of the universe and of man's place in it. This tends to contribute a relation to what is seen such as is so well stated by Keats in the line:

A thing of beauty is a joy forever.

With the development of such a mental state one who has seen the Grand Canyon or Crater Lake or the prominences on the sun will have ever after a new illumination on every object touched, whether in the vastnesses of great spectacular phenomena or in the smaller things of everyday life.

If we consider the situation in appreciation of nature from day to day as influenced by the factors mentioned, first of all, we see the world which has been dissected into its various parts by science now becoming more wonderful and more beautiful because of the intimacy of understanding made possible

by this intensive study. We see that the world is not to be considered solely from the point of view of results of scientific dissection. It must be evaluated also in the light of the picture which the human mind develops. In other words, it is essential that today we look upon our contact with the natural world as a many-sided relation, all aspects of which must be considered together if the philosophic influence is not to be looked upon as subject to such distortion as to give us a largely erroneous view. One poet has said that man is a "many-sided mirror who may reflect to many a shape of error this true fair world of ours."

In discussion of this aspect of the problem, two essential points must be noted: one, that nature never has exerted, and never will exert, great influence upon us unless there is intellectual or spiritual contact with it: the other point relates to the fact that on those without a philosophy of life a philosophic influence is rarely exerted. It would, in very many ways, be unfortunate if, as has been the case with many nature writers and poets, we were merely to look upon what is seen in terms of trivialities which may be projected into it. One appreciates the meaning of this situation in observing visitors spending their time at Yosemite or at Grand Canyon in throwing out from their barren minds projections of monkeys, codfish and other types of animals which they try to see in the marvel-

ously sculptured walls. Imagination should not be restrained, but it should be used for developmental purposes.

To be sure, there is fundamental safety in a philosophy which serves at least as guide for action until such time as reason operates for its modification. Every act of every individual is in large measure based upon the accumulated and coordinated results of inheritance or of acquired characters which become habit. Walking, speech, and digestion would be difficult if one were required to frame every action as the operation proceeds.

In considering contact with nature it is not desirable to wander too aimlessly in order to be educated. It is important to realize that in such touch there is one of the superlative opportunities for joy of living and betterment of physical and spiritual health.

Day-to-day living may bring almost infinite range of pleasurable experience through coming to know more intimately the great number of beautiful and stimulating things spread before us. When our perspective is properly adjusted we discover that the qualities of a simple flower or of a fragment of rock may tell a story which can be expanded so as to present a picture comparable in wonder and beauty to what might be seen in a great mountain or a luxuriant forest.

Once such features as these are well understood, and in some measure appreciated, they become a part of the world of wonderful things which we remember as representing the universe around us. Then we enjoy them as old friends bringing continuously renewed interest in nature and its meaning. And often as we come upon these treasured elements we find that from a new point of view they present new beauties and new aspects of inspiration.

So as time passes in day-to-day living, we are continually renewing our interest, and bringing into our thought new views of familiar objects which come to have places of the first order of importance in the mental furniture represented by our memories. And these new aspects of beauty and appreciation are built into the foundations of our lives in such manner to participate intimately in the framing of a structure which is in a sense the home of the soul, and which becomes a place of profit and delight.

It was apparently much in the mood of what has been written above that Keats referred to the consistent development of our interests and joys in the infinite variety of things beautiful and wonderful, when he wrote among the early lines of Endymion the words:

> Therefore, on every morrow, are we wreathing
> A flowery band to bind us to the earth.

Chapter VI

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RESPECT AND LOVE OF NATURE AS A COMMON INTEREST OF ALL PEOPLES

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CHANGES that have taken place over the whole world in the past two centuries make it evident that we are approaching a crisis in which either civilization will collapse or we must discover the formulæ necessary for establishing such an understanding among nations as will permit continuity in peace and in constructive effort.

Excepting those who are greedy for control, there are few who believe that military decision will bring the required adjustment. Rather must we expect advance to be made on the basis of mutual understanding, and on the acceptance of principles that are determined by reality and truth. The progress necessary for attainment of conditions needed for peace will be made possible by careful study on the part of students of government, sociology, economics and of all those aspects of knowledge involved in science, philosophy and religion. And in this group there must also be some possessing sufficient vision to see all of

the various subjects in one field and with clear perspective.

As one of the problems which must be thought through with care in preparation for the day when peace will begin its reign, we may not overlook certain common interests of all peoples of the world arising from appreciation of great principles originating in our understanding of nature. A part of the difficulty in the world at the present time is due to moderate variations in the physical, psychological and spiritual make-up of the different races and peoples. These qualities or differences we may consider as in some measure an expression of nature, since human beings are a natural outgrowth from the world in which we live and are also influenced to some extent by their environment. Unfortunately much of the discussion regarding racial differences arises from more or less unscientific opinion for purposes of propaganda rather than as attempts to find the truth.

Whatever the differences may be among peoples, it is important to bear in mind that we all live on a world in which the expressions of physical, chemical, and biological law are much the same over the whole area. There are differences of environment in terms of the land, climate, vegetation, and animal life, and our relation to these variations on the face of the earth must be taken into consideration as a part of

the background against which the points of view of different people are projected if we are to understand their meaning fully. And yet we all face the same world, our lives are guided by adjustment to laws and conditions which operate consistently over the whole region, and we have similar groups of philosophies built upon what we conceive to be the fundamentals of life and existence as illustrated in our surroundings.

One may assume that whatever is done to call attention of the peoples of the world to their common interest in nature, and to the similarity in their points of view regarding principles or beliefs which arise out of contemplation of nature, will help in some measure to bring to comparable viewpoints their opinions upon human problems illuminated in some measure by the light which comes from the study of nature. In general, in consideration of the common interests, beliefs and objectives of different peoples, there has been a tendency to overlook similarity in point of view with reference to these questions.

Approach to consideration of common points of view among peoples on questions that relate to nature will be from several directions. First of all, one may assume that it is important to have community of interest and similar approach and cooperation in study on all scientific problems for which the solutions are

obtained through nature. In spite of the assumption that science bases itself on realities and rigorous adherence to the truth, one finds wide differences of opinion among scientific men, and even among investigators concerned with problems for which the answers are obtained in study of nature. Solution of many difficulties of this type is found through cooperative investigations, in which students from different institutions and different regions join in research on the same types of materials. Through such an effort, based upon the understanding that it is realities or facts that are being investigated, and that only the verifiable data can be accepted, it is possible to set up a body of knowledge toward which all have contributed, and which all have checked, so that upon the results one may expect no real difference of opinion. Such materials from science, serving as they do frequently as a basis for economic or social or governmental projects of peoples, will go far toward establishing a community of interest which could be shaken only with greatest difficulty.

In the field of art, it is possible also through joint effort to establish points of view having important bearing upon a wide range of human interests among different peoples. Approach toward such a subject can also be made to advantage by joint effort in the delineation and interpretation of artistic materials in

different countries. Not only do the data assembled serve to guide or reconcile viewpoints having far reaching relation to beliefs, but the materials accumulated serve in an important way to acquaint the people of all countries with the types of environment and the artistic influences exerted upon each people. Through this means there may develop a better acquaintance among the peoples as to environments and regarding points of view, and a broader education of all the people regarding the major features of nature in the various countries.

Advance in development of cooperative study both from the point of view of science and of art, as also in relation to other fields, will proceed most satisfactorily if common interest and concerted attention can be directed toward the planning of this work by an agency or agencies representing the many countries concerned, with cooperation of the different institutions and countries that may have special interest in the subjects involved. One of the most effective means for furtherance of such common interest in science and art is presented by the Pan American Institute of Geography and History, covering as it does a wide range of subjects touching science, art and related interests and concerning itself especially with problems involving both geographic relations and succession in time. At the Third General Assembly of the

Pan American Institute held in Lima, Peru in April, 1941, this subject was discussed with special reference to origin and evolution of cultures, to the need for cooperation in scientific research, and to the importance of recognizing the common interests of the various peoples in the appreciation of nature. On another occasion special attention was directed toward the need for consideration of the artistic values of nature in the several countries, and the desirability of cooperation in bringing out the principal points of significance of each country for the benefit of all the countries.

Development and clarification of the interest of peoples over the earth in the elements of nature with which they are in contact may serve to draw them together in study of their common interest in the natural world. Especially will close relationship of peoples be advanced if the study or contemplation of nature is accompanied by effort to reach more deeply into a vision of what is available, and to obtain better understanding concerning significance of the phenomena observed.

It is also to be noted that the degree of development in community interest regarding nature will depend in considerable measure upon the extent to which the peoples in the several regions develop their close relation to nature along with appreciation and enjoy-

ment of its values in day-to-day living. In this connection there should be an effort to bring to each people some understanding of what is done by other peoples in their enjoyment of nature. It may be that in some countries materials are available but not used, which in other countries are used to great advantage, not merely in development of science, art and philosophy but in day-to-day living as well.

The cooperative relation among peoples of the world in study of nature should be planned both with reference to specific fields of observation as in science and art, and with regard also to bringing about interlock of the various types of study so that each of the points of view might be strengthened by data obtained from coordinate subjects.

It is also important that in the broader study of nature by the cooperative method among peoples of the world attention be given to ways in which observations from the point of view of science and other subjects may make contribution of importance in the attempt to understand questions in fields which are more specifically economic, or social, or governmental, or perhaps even religious. This interlock of the several subjects as it leads up to possibilities of meeting practical needs may be of great significance.

It is desirable also to note that the interest of various peoples in nature is on a plane comparable to

that of other familiar things of life, such as the joys that come out of life of the family, the home, and community. Or the love of nature may be related to love of beauty, or to respect for religious belief, or to appreciation of our responsibilities to other persons in the family or in the community.

Chapter VII

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NATURE AND THE RELIGION OF PROGRESS

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IN MANY forms of religion developed in past ages for guidance of conduct and crystallization of belief it is interesting to find evidence indicating influence of nature as affecting formulation of these ideas. It seems, therefore, desirable to inquire, in the light of present day knowledge, what major influences of nature are especially significant in directing and supporting principles that we consider fundamental. It is hardly to be expected that there would be unanimity of opinion as to what among these factors would have highest importance. But there is reason to believe that of concepts in science arising from study of nature, there are none that would be considered to have influenced our belief more deeply than the generalized principles concerning development or evolution, reaching through vast ages in the story of the earth, and leading ultimately to advance in human life and institutions.

As an outgrowth of the view of nature seen today through personal observation and through study of the ideas which organized science has produced, there

is strong evidence that this vision of life development affecting us so deeply tends to transmute itself ultimately into emphasis on what we call progress. It is also important to note that our thought is deeply influenced by what might be called the uniformity or universality of expression in laws or modes of procedure of nature in space and in time.

As result of this situation one notes that in studying the universe widely in space, and deeply in time, out of our developing experience there tends to grow an attitude toward life that gives perspective instead of formless space, order in the place of aimless movement, confidence in the dependability of the universe and its laws, and faith that the world is so constructed as to maintain the trend of its development or evolution or progress.

Such an attitude toward this world and its meaning is enormously important to us when, as now, complicated dangers and evils seem almost to overwhelm us. This situation may be presented humanly by the statement that of conditions considered by us as exceptionally significant in shaping our lives, there would be almost universal appeal for guarantees of opportunity to make progress, and for the kind of security favorable for our advance. Such were the basic conditions for living defined in our declaration of independence. Life, liberty, and the pursuit of happi-

ness are involved in opportunity and security. While realizing that the factors governing attainment of these situations may seem of temporary character, in general we are impressed by evidence indicating that the real controls are of long time or permanent effect.

Although, compared with the whole of time as we know it, the life period of human beings is limited to a relatively brief span, commonly in planning his life the individual takes into consideration both the activities set up by his forebears and the possible influence of his own constructive work upon what may follow. We tend in general to recognize the importance of building upon what was created before we came into being, and to give credit to those who have thus served to prepare the way. At the same time we appreciate the need of doing our part in laying foundations for future advance. In other words we show evidence of preferring to live in a world characterized by conditions that are consistently favorable to continuity in progress.

While desiring progress in all things, one may not avoid seeing that in human affairs what we call definite principles or trends are maintained only with difficulty. The fact that human beings have freedom of choice opens the way for a wide variety in types of activity. Only careful education covering the factors influencing human life, and extending over gen-

erations, can establish points of view that persist. But in the long run, even in human affairs, there develop principles that commend themselves to mankind as dependable and as promoting both progress and security.

By reason of the great extent of things with which we deal, the fact that the record from which we read this story is vastly complicated and the elements are distributed over the whole world, it is extremely difficult to present the simplified picture of earth history that we have in mind. There are, however, a few places such as the Grand Canyon of the Colorado where outlines of the larger story are displayed in such manner as to make them easily understood. From these materials it is possible to reduce certain of the major aspects of earth history to something like simplicity for the purpose that we have in mind.

In the Grand Canyon of the Colorado the record exhibits almost unbelievable evidence of reality in the features preserved, as also in the sequence of their appearance, and the changes that took place as the record was being made.

This is a place where history not merely reveals itself, but for every one seems waiting to tell its story. With a sense of reality like that of the present, in standing before these ancient links in the record of

the earth, we are conscious of the streaming waters that rattled and pounded the heaps of worn and battered rocks now a part of deeply buried formations, or of lapping waves as they spread the sand upon beaches where crawling things marked the rhythm of their pace upon the floor still preserved for our examination, and the whole long panorama represented in the Canyon wall becomes a thing of life.

But the meaning of it all is not comprised in the startling reality of the many episodes in history that one encounters, nor yet in the truth that the sequence in which we find them is the order of changes in nature. When from some commanding point one looks out over the spectacle, not merely is there apparent the true significance in each of a multitude of incidents in order, but the relation of these differing aspects of the world to each other translates them into an expression of activity extending through time. One sees the mechanism of nature and of history as if with all its parts in operation, and compasses the great complex in a single sweep of vision.

As this abyss of time cuts down across the ages, it presents in clear perspective of one great picture the reality, the sequence, and the movement in a vast tide of events. The beginnings do not appear, but upon the high walls enough is written to illustrate the

processes of change, and to show us also that the end is not in view.*

Assuming that we are correct in looking upon our situation in this world as favorable to progress, it is important to utilize all available information in planning for continuing movement of the human group along all lines open for real forward movement. In studies on the possibility of further advance in the type of life that man may develop, and the ideals that he may use, it is more important for us to have accurate knowledge regarding growth or progress of the elements which together constitute the mind, than of the skeleton and the general organization of the body.

In absence of such information as one might wish we may speculate on certain aspects of evolution in the types of life from which we are presumably derived through evolution. So, by comparison with other phases of the living world, and by knowledge of the environment in which living things have developed, we may form some idea of the reactions which resulted in evolution of a complicated nervous system, upon which origin and growth of the mind have been dependent.

We can assume with some confidence that in the millions of years since origin of the earliest forms of

* Extract from *The Living Past*, J. C. Merriam, pages 90–92. Charles Scribner's Sons.

life, in which there developed varying responses to the most powerful influences of the environment, there arose the types of reactions which we call nervous, designated as touch, taste, smell, the influence of light ultimately leading to sight, and the reaction to vibrations which led to what we call hearing. And finally, when these aspects of sense development had become important individually, there began the co-ordination or correlation of the various types of reaction giving the possibility of locating relative position with reference to the world of influences and forces in the environment. And when at last a creature emerged with a central nervous system permitting correlation of sense impressions, the basic elements of thought began to develop, and ultimately there grew up the possibility of intercommunication in what we call speech. In this development tremendous impetus was given to thought and all that has arisen from it. Shelley in "Prometheus Unbound" went so far as to say:

> He gave man speech, and speech created thought,
> Which is the measure of the universe;

Bearing in mind the idea that desire for definite relation to future advance seems inherent in the nature of human beings, it is important that we give consideration to the various ways in which this desire

might be satisfied. One approach to this condition giving a goal assumed to furnish satisfaction is through the idea of a heaven, or a future state distinguished by conditions more favorable than this life. But perhaps the idea through which a future state is visualized might be satisfied in some part by evidence of conditions that would seem to guarantee continuing influence of human personalities.

Commonly the difficulty in attempting to set up or to develop a point of view relating to future life concerns in large measure this question of individual immortality. It is generally assumed that individuals desire eternal life, but these assumptions may be made without considering whether this situation would be as desirable as it has been pictured. A large percentage of individuals would seem to be satisfied only by continuing development, or advance, or accomplishment, which is commonly covered by various interpretations of the word progress. We are therefore faced with the need for considering in how far there would be satisfaction in such progress, even if the individual were not present as a personality, but were represented only through his influence.

No better illustration of this question of relationships can be found than in study of the major international problems as they touch us today. At this moment in history the world is engaged in an attempt

to bring into adjustment a great number of issues which have come to the point of conflict. Unfortunately many assume that military decision will mean settlement of these problems, but a broader view makes it evident that the conclusion must rest on a basis of clear understanding for all of the interests and factors involved. This means that we need to trace the various problems wherever they may take us over the world, and however far they may carry us into the remote past. At the same time it is necessary for us to consider the effect of these situations upon the future. It is with this broad vision of what is involved that the settlement of world affairs must be adjusted in preparation for what is called from many points of view a New Order.

Through the long ages in which mankind has been developing, and in which there came into being the many conditions that guide or control human conduct, there has grown up a vast complex of factors so interlocked that it becomes extremely difficult to appreciate their meaning. In order to understand the conditions, and the values represented, as the necessary preliminary to any adequate settlement of world problems, we must know what the longer history is, and what the major principles are that we see involved in this course of evolution.

We have become fairly familiar with the term isola-

tion or isolationist with particular reference to international relations of the United States. But we must learn also that it is just as important to realize that mankind of today does not live in an isolated present separated from the past and the future. We may no longer think of the past as in a manner a static ruin without significance to us. In the same way we must realize that what we call the future is not seen merely as vistas between castles in the air. It represents something that is actually coming to be, the character of which may be bettered or marred by that which moves through past and present to the future. And the stream of this movement is necessarily in part through us and therefore partly under our influence.

Some years ago H. G. Wells in his book, *The Discovery of the Future*, referred to time relationship in the words "we perceive that man, and all the world of men, is no more than the present phase of a development so great and splendid that beside this vision epics jingle like nursery rimes, and all the exploits of humanity shrivel to proportions of castles in the sand."

The evolutionary series recorded through the ages, and the movement or progress which it shows, are the expression of what was attained through accumulation of modifications appearing in the succession of living generations.

If it be true that the major questions of world history upon which we now think are parts of a great stream of movement passing through the ages, then what we do with our lives is unavoidably carried along to have some part or effect in what takes place in the future. The extent to which an influence is exerted in times to come will depend upon the importance of what is done now or has been done in the past. Perhaps it does not matter greatly whether we shall be able actually to stand upon the stage in some later period and make the speeches or move the levers that have influence in activities, or whether we are able to see the later effect of what we do. A situation such as that which we discuss corresponds in some measure to the point of view of the architect who helps in planning a great cathedral, knowing that realization of the structure in its final form will certainly require centuries.

In major questions of belief presumably there will always be marked variation in formulation of theories or doctrines, depending upon assumed importance of personal problems. In all probability a considerable percentage of the people of the earth hold to beliefs for which the foundations would be difficult of definition, but these views of varying types are often accepted by reason of the fact that they offer that degree of comfort in living which makes it possible to go

forward without complete loss of effectiveness. There are cases in which the individual maintaining a particular position is aware of the doubtful value of what is accepted as faith, but is nevertheless moved to consider the situation as making possible much in life that seems to have real importance.

There are others who, living under conditions that are less unfavorable, attempt to secure as nearly as possible a solid foundation for controlling ideas, feeling that there is large advantage in relatively secure grounding of belief, such as would make possible the farther reach of whatever is built upon such a foundation.

Whatever our stage of advance in ability and knowledge, we may always be expected to raise questions concerning value in ultimate authority. Fortunately modern points of view tend to show these arguments arising generally from similar sources, so that the ultimate foundations may not differ as widely as has been assumed.

With reference to problems concerning what might be called a religion of progress as here discussed, it will be seen that the sources of authority for discussion have been taken from the natural world about us. And nature is assumed to represent the activities or the being of the power behind it. So for example, what we know of the story of creation including the

development of living structures and ideas, is involved in the universe as we see it. And, if there be a power controlling nature, it is to be expected that we would look upon this story as representing the power or intelligence behind the scenes. On the assumption that there is a God in the world, nature would be in a measure the living mantle of God.

As we see the world of present and past spread before us it is impossible to avoid being influenced by the expression of continuity in modes of action or law in nature as extending through space and time. In the same way we see evidence of growth or development spreading over the continents and seas and reaching through the ages. It does not seem possible to separate the story of the present from that of the past, and the picture presented indicates that the conditions which governed the creative process in the past are essentially those that operate today. Therefore we tend to accept the idea that whatever power is represented in the continuity which has characterized the world thus far will maintain itself, making the world a place that will be ever new, and vital, and hopeful.

Continuing faith in progress over the world will be based in large part upon evidence in the earth's story to which attention has been called in the preceding discussion. The foundation of our views and

of our faith will rest upon interpretation of the picture or the record made by the creative processes and continuing now in the wider story of the earth and man as we see it. Advance in understanding of this story and its meaning will depend upon application of our intelligence to the work of interpreting the marvelous record open for inspection. We shall have constant need not only for clear vision and accurate interpretation of available data, but for continuing research to make available the additional data further study may produce. By this method, our knowledge of the present and past applied to interpretation of the future will bring an ever clearer picture of the world of nature and of people and of its meaning to us.

There should be no doubt that as our vision widens, and deepens, and is more fully clarified, the results of this study will have increasingly significant application for interpretation of world problems of the kinds that perplex and harrass us in this age. Without question the data and their meaning will have large importance in guiding development of those conditions which we conceive as preparing the way for a new world order.